

Clinical Epidemiology: Disparities in the Development and Progression of Hypertension

Daniel T. Lackland

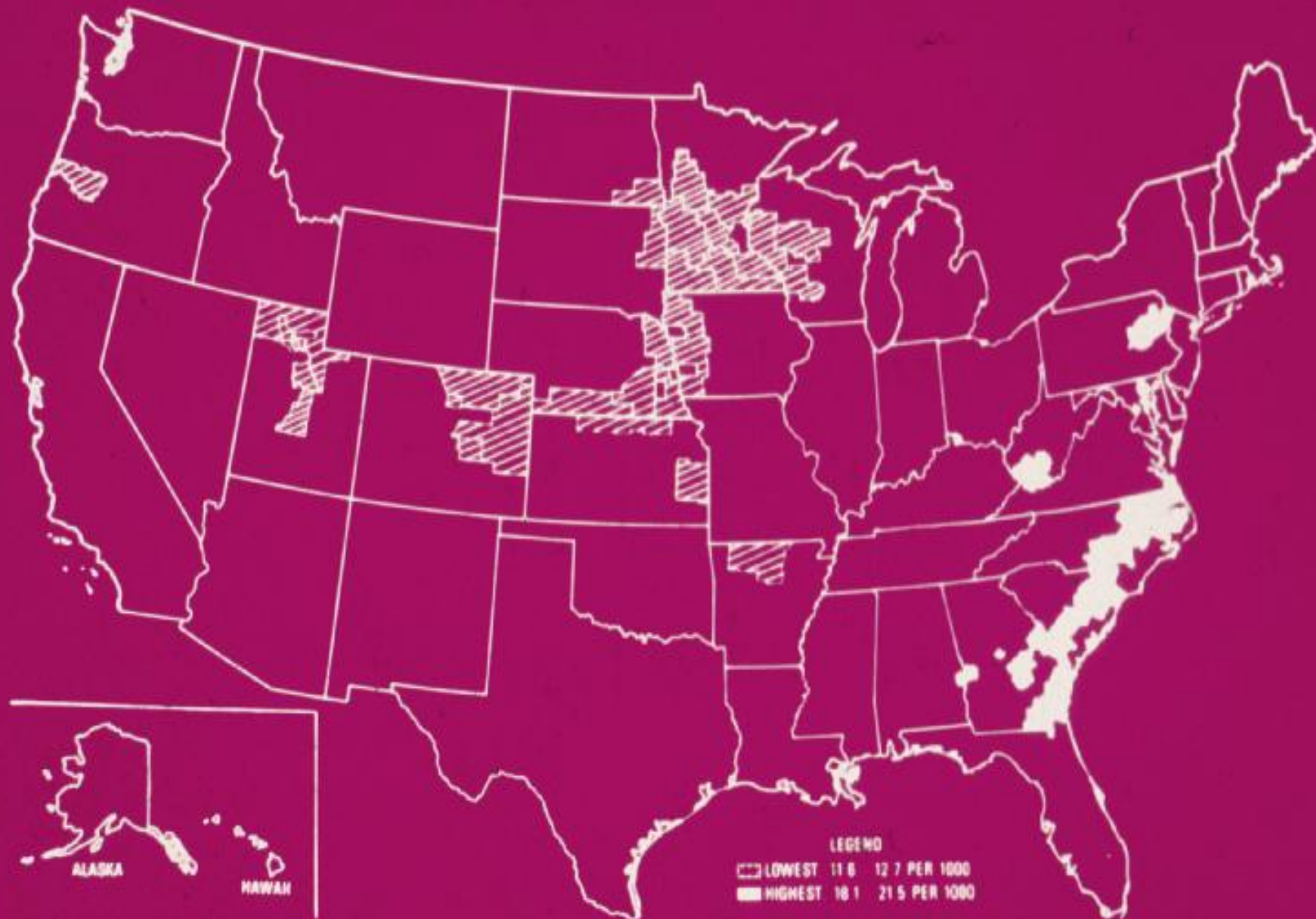
Disclosure of Financial Relationships over past 12 months Daniel T. Lackland

- Grant/research support: NIH, Novartis
- Speakers Bureau: Merck, Novartis, Sanofi Aventis





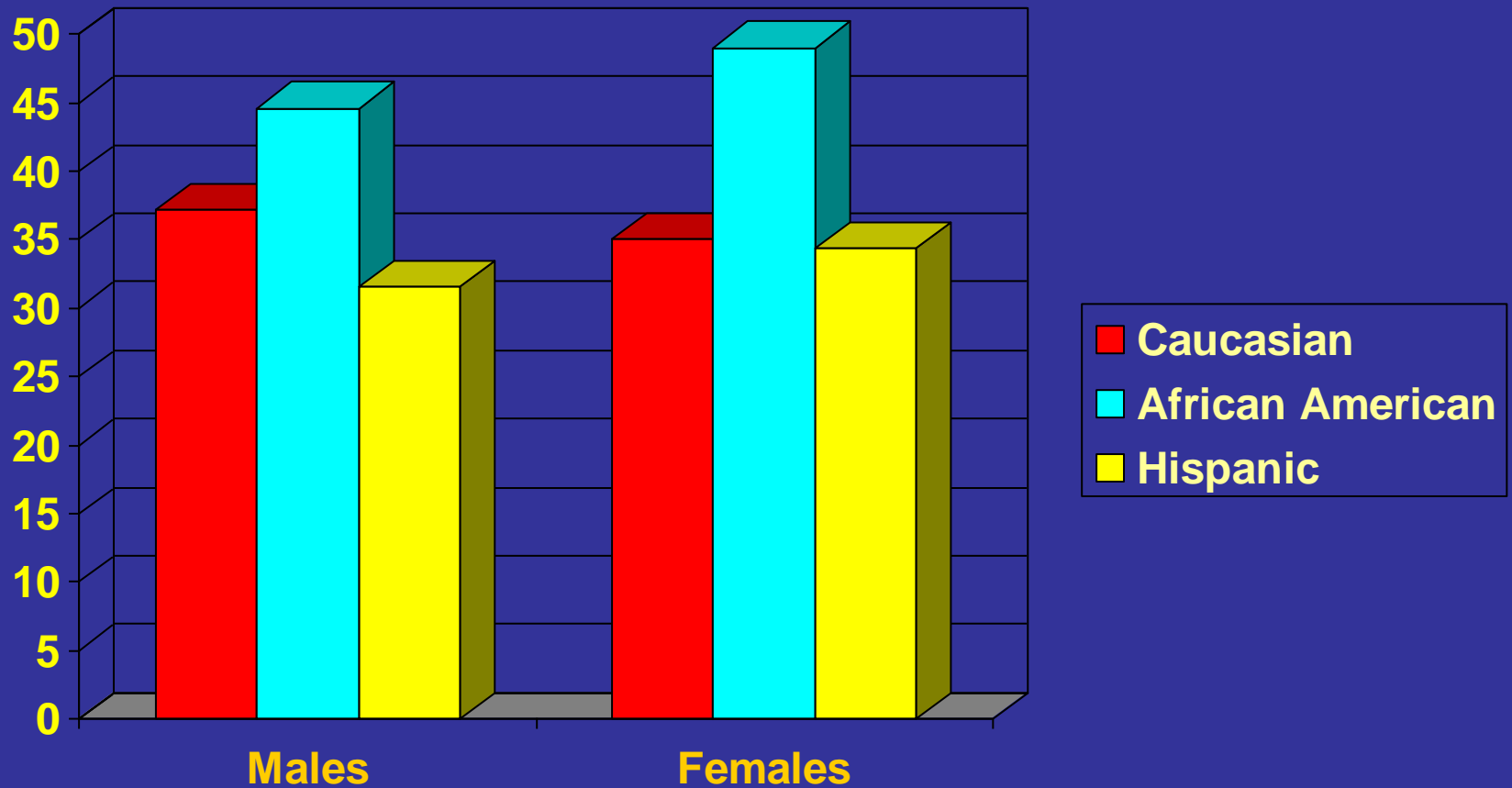
National Library of Medicine



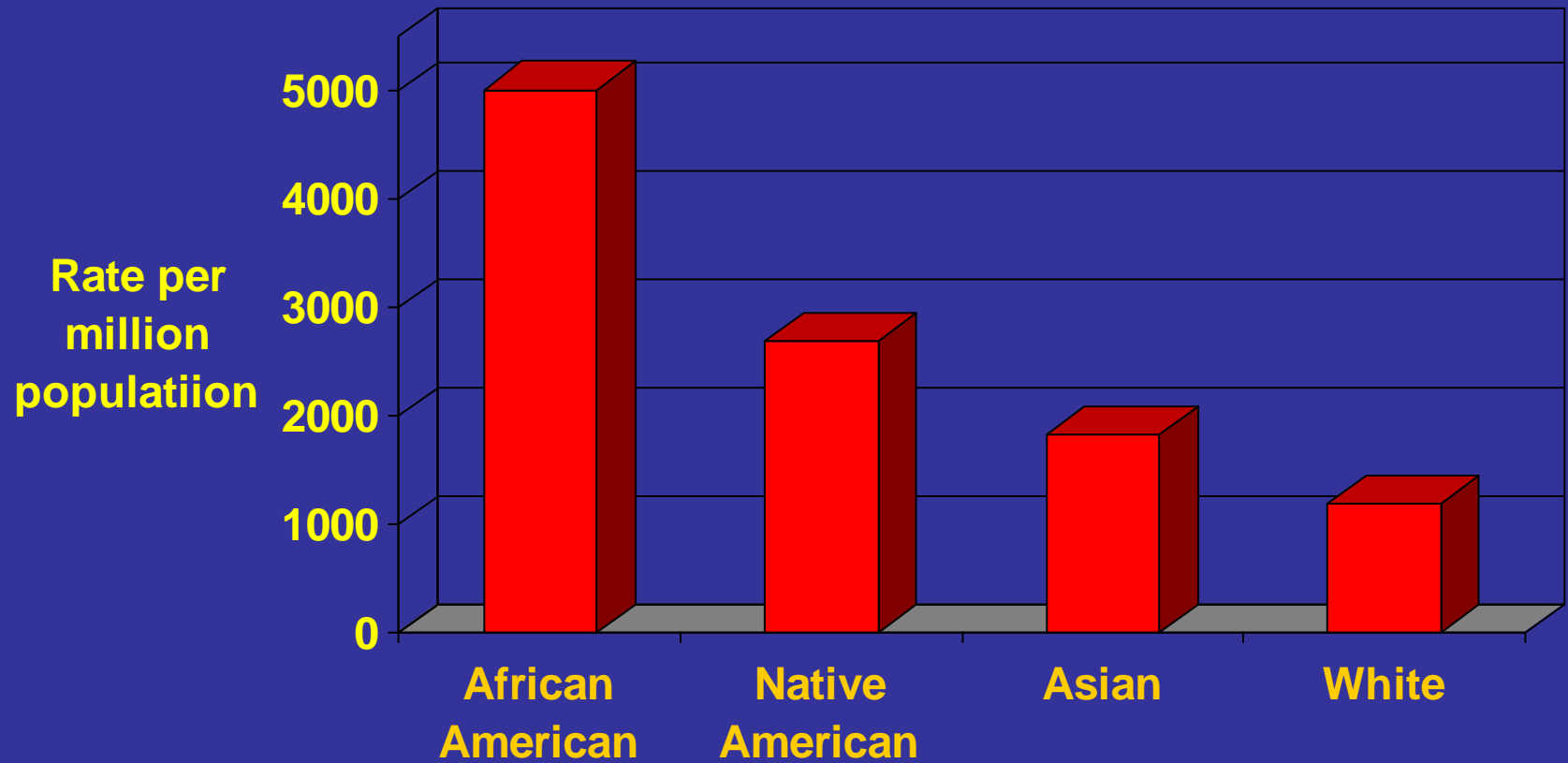
Disparities

- Hypertension outcomes
- Hypertension risks
- Prevalence
- Awareness
- Treatment
- Control
- Treatment effects

Prevalence of cardiovascular disease



Prevalence of End-Stage Renal Disease 2006

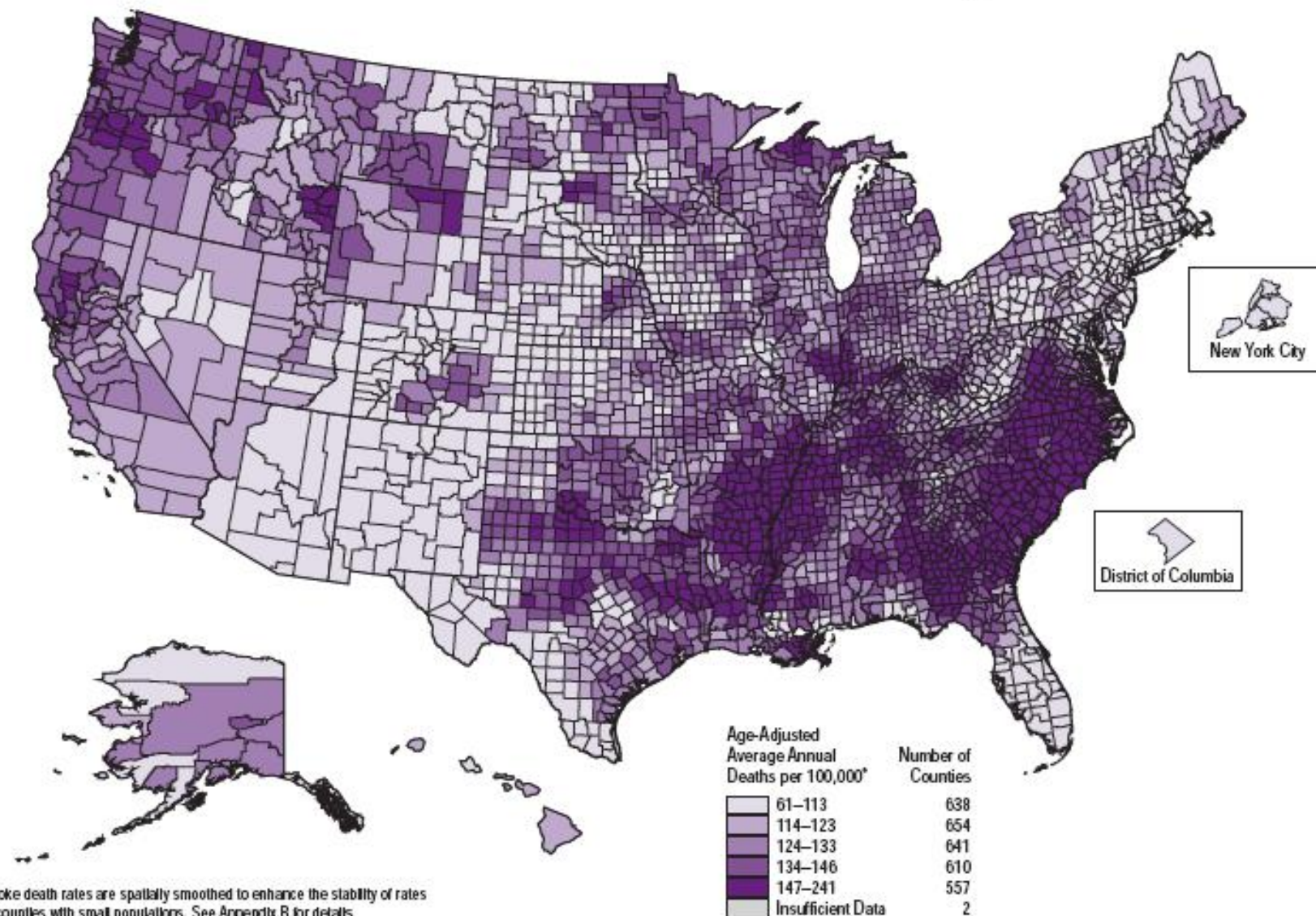


USRDS, 2008

50 years later.....

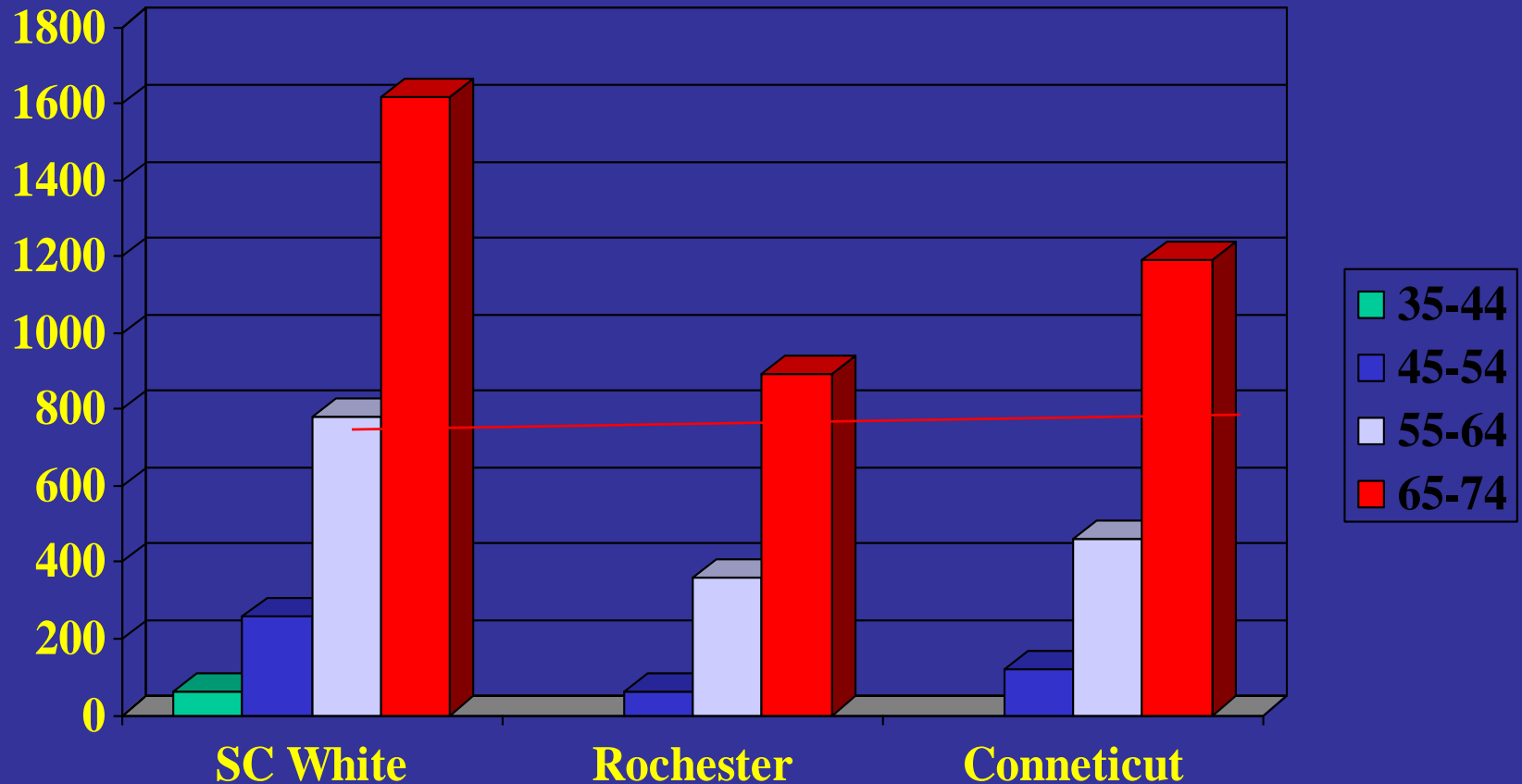
Smoothed County Stroke Death Rates 1991–1998

Total Population
Ages 35 Years and Older

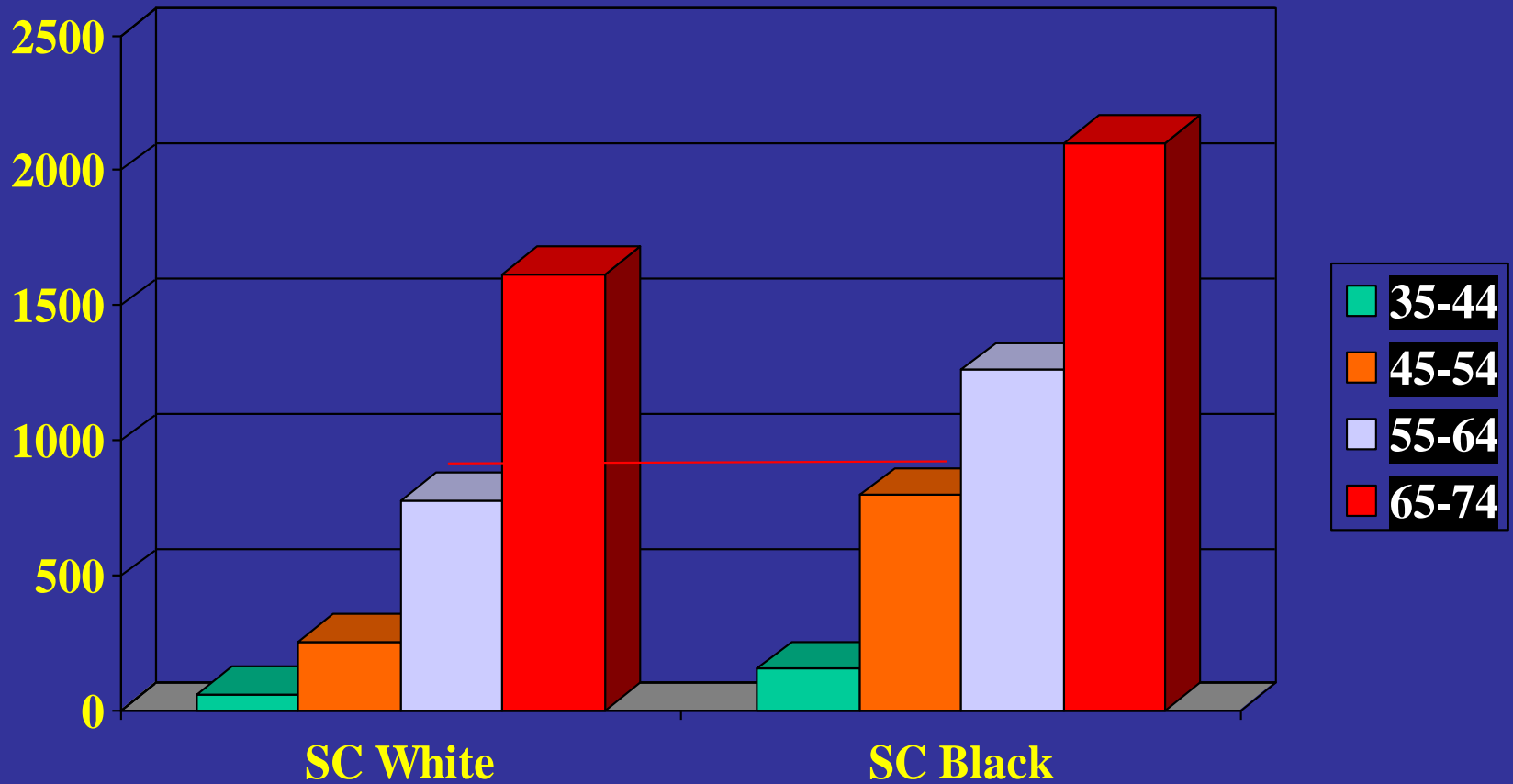


*Stroke death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.

Stroke Incidence from Three US Populations, White Men



Stroke Incidence Men, South Carolina

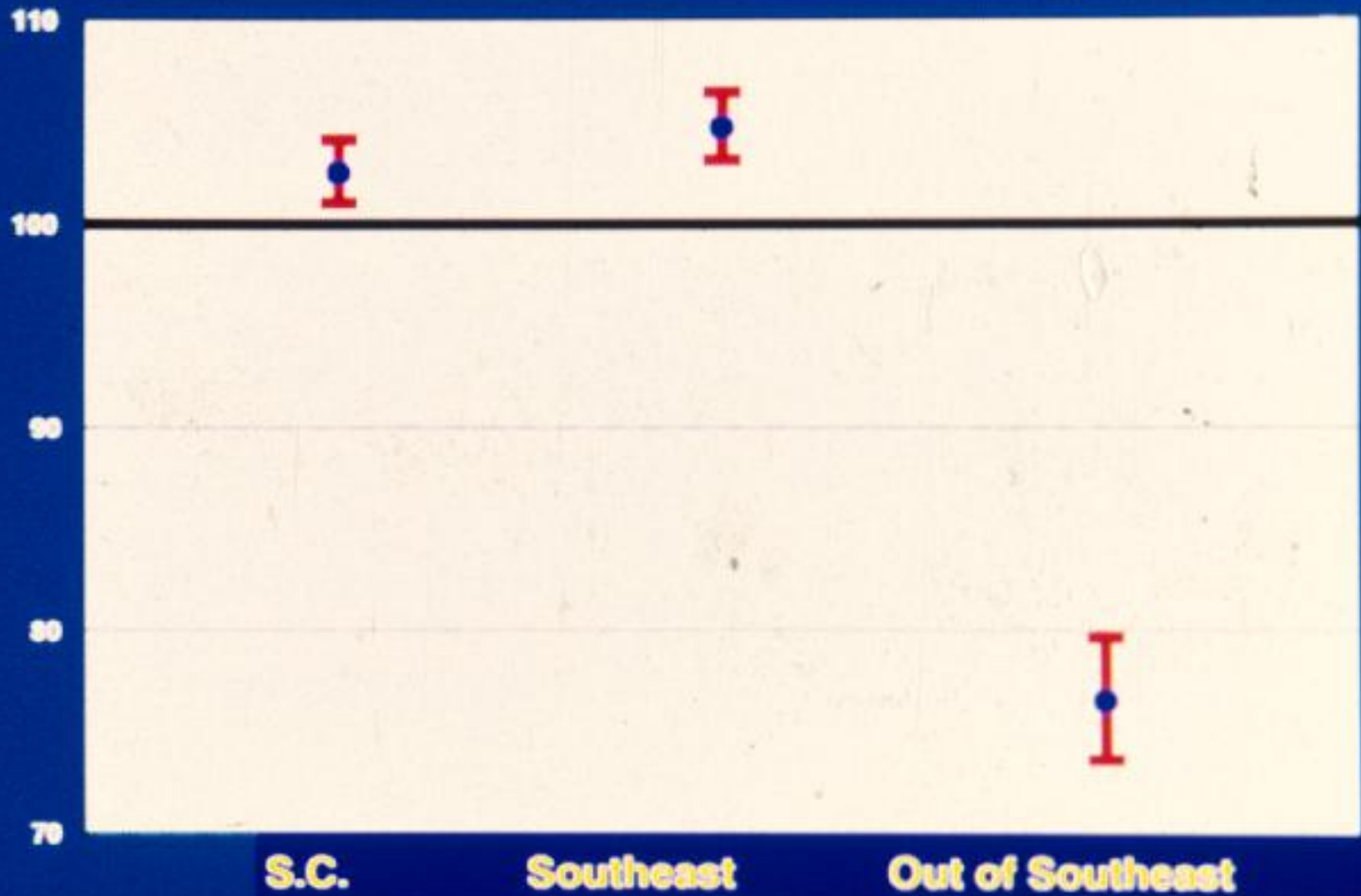


Born in Southeast



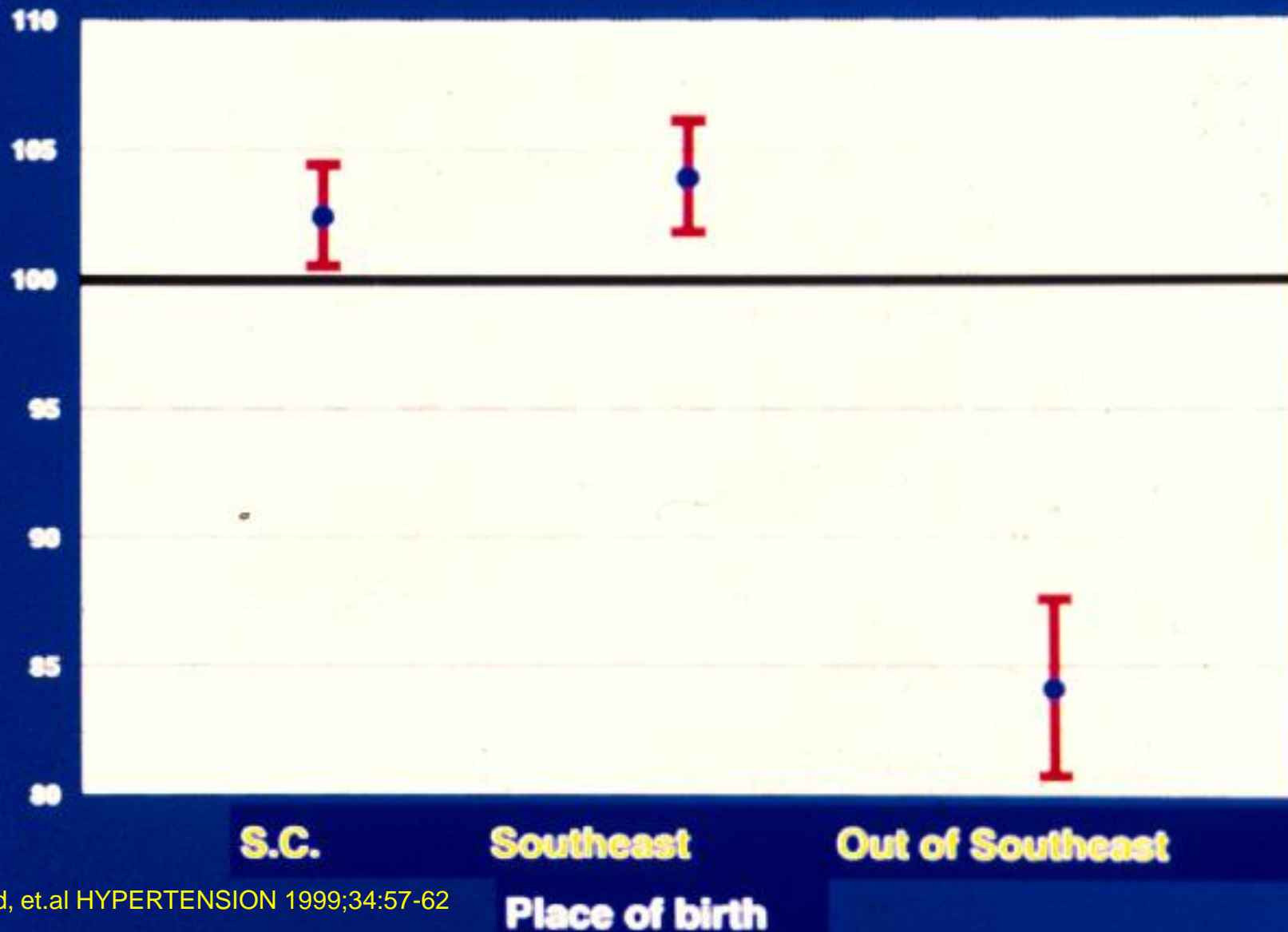
PMR (95% CI) Cerebrovascular Disease Mortality

Total



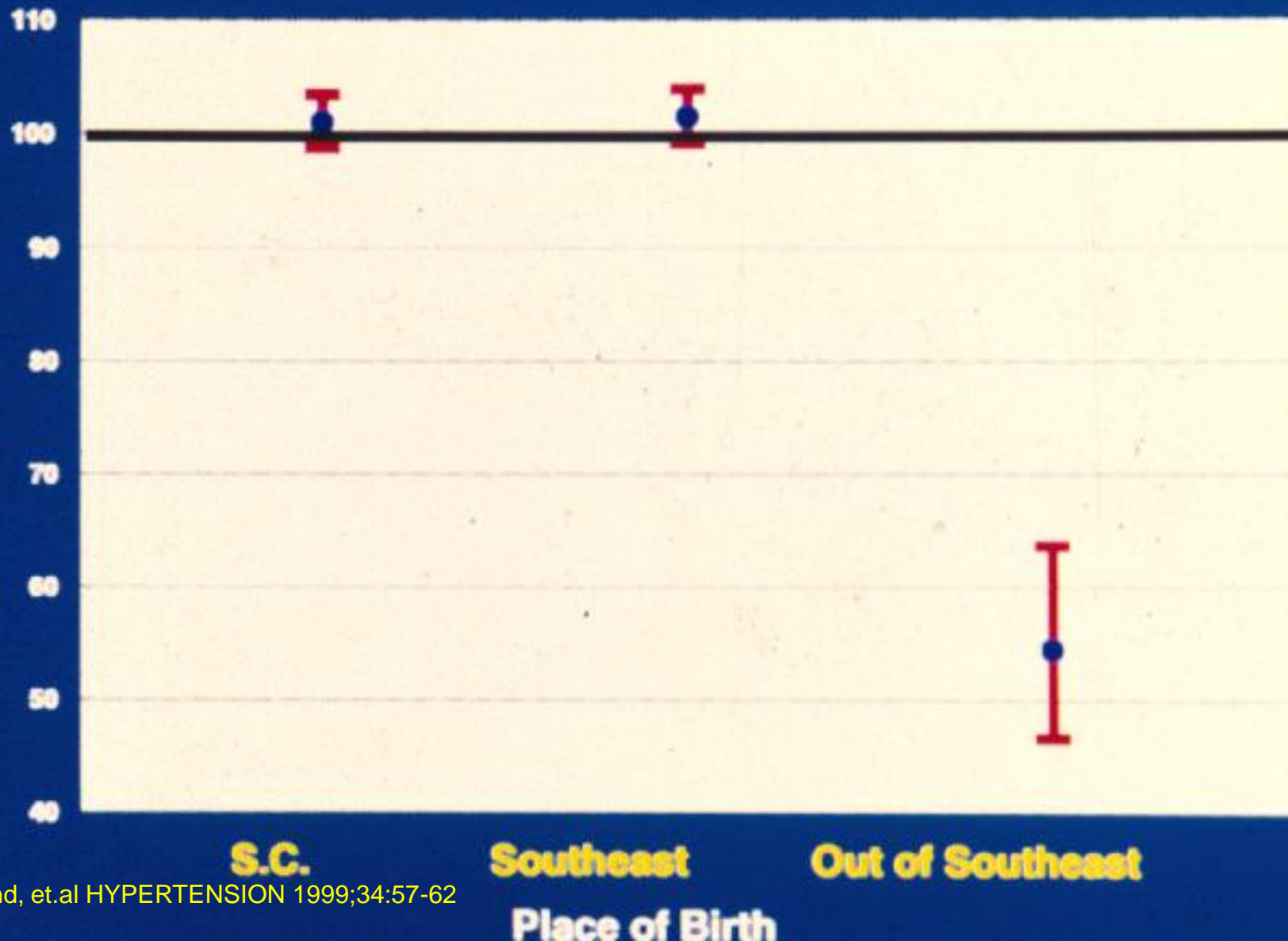
PMR (95% CI) Cerebrovascular Disease Mortality

Whites



PMR (95% CI) Cerebrovascular Disease Mortality

African-Americans



Residency

- Time period in Southeast with greatest risks – birth through 20 years
- *Virginia Howard, PhD - 2008*

Prevalent rates: All

rate per million population, point prevalent ESRD patients
alive on December 31, 1999, by HSA, smoothed

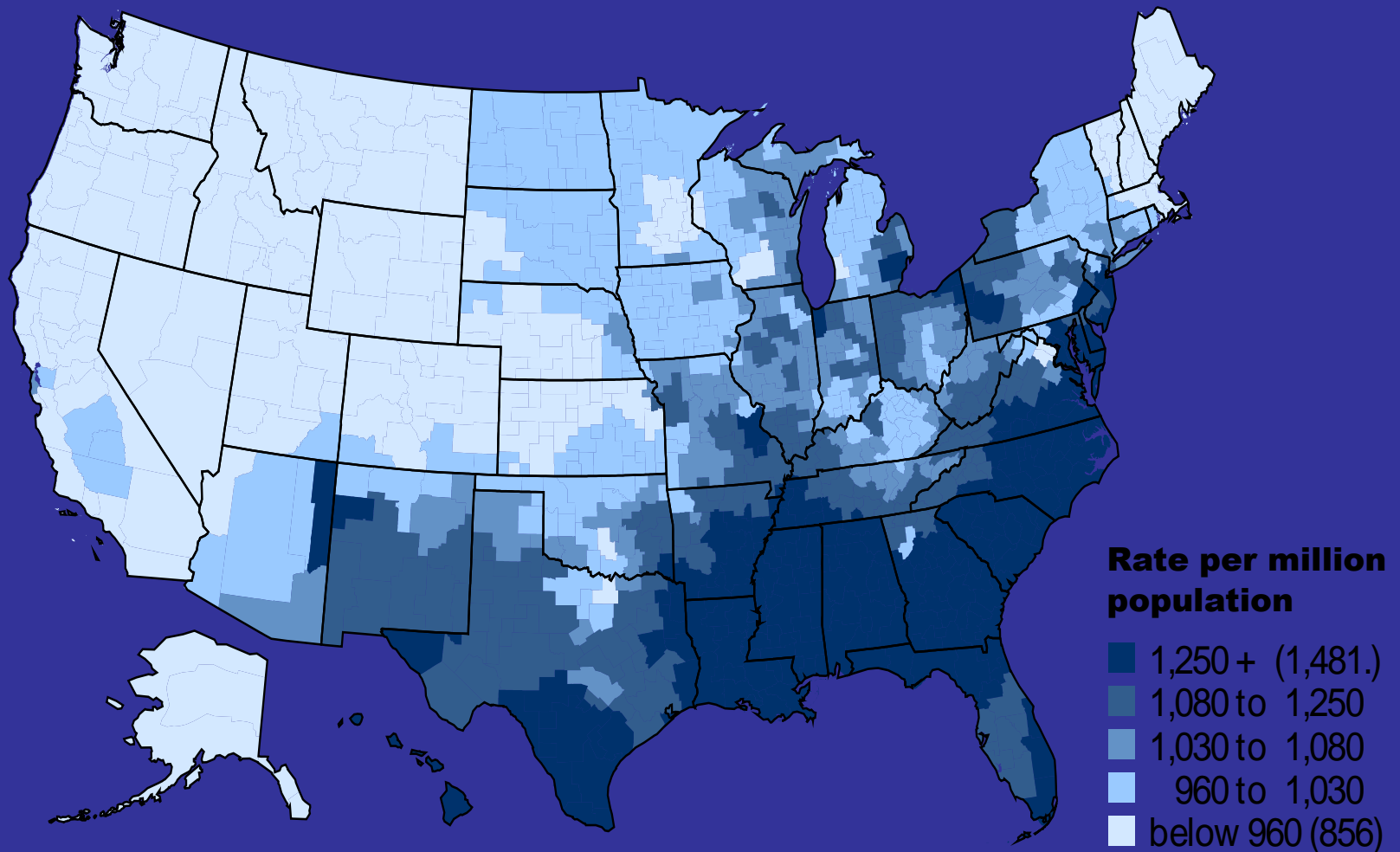
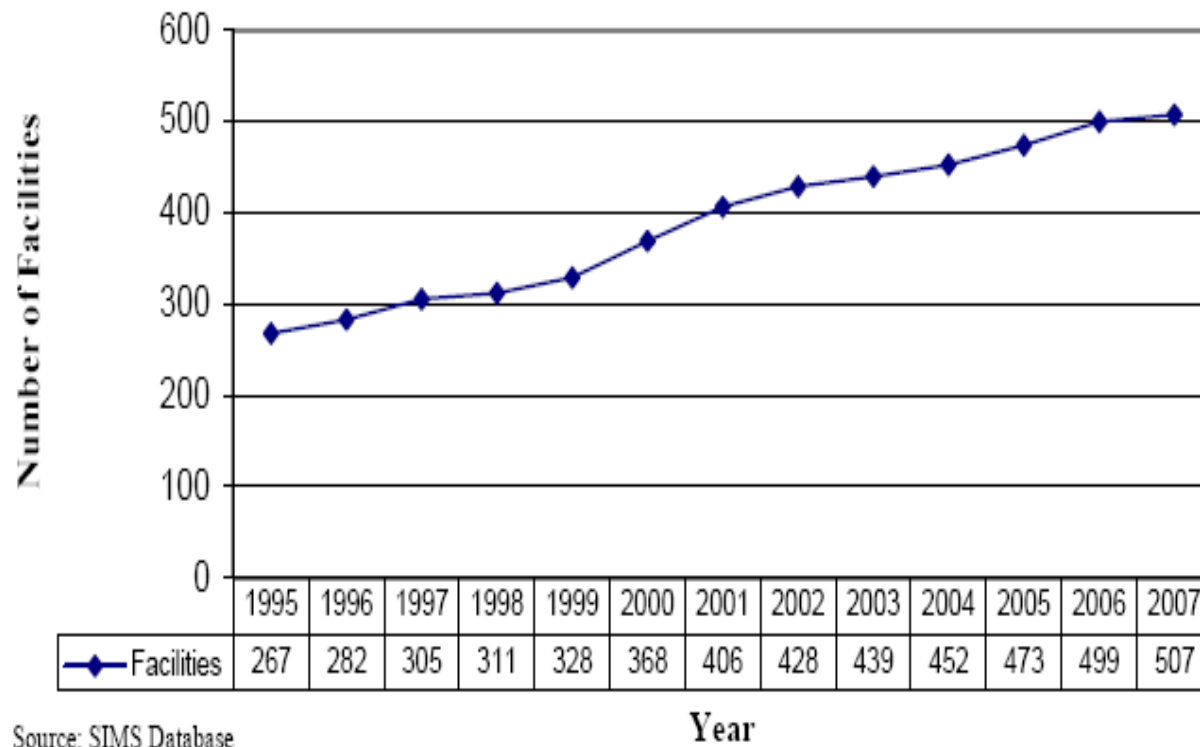


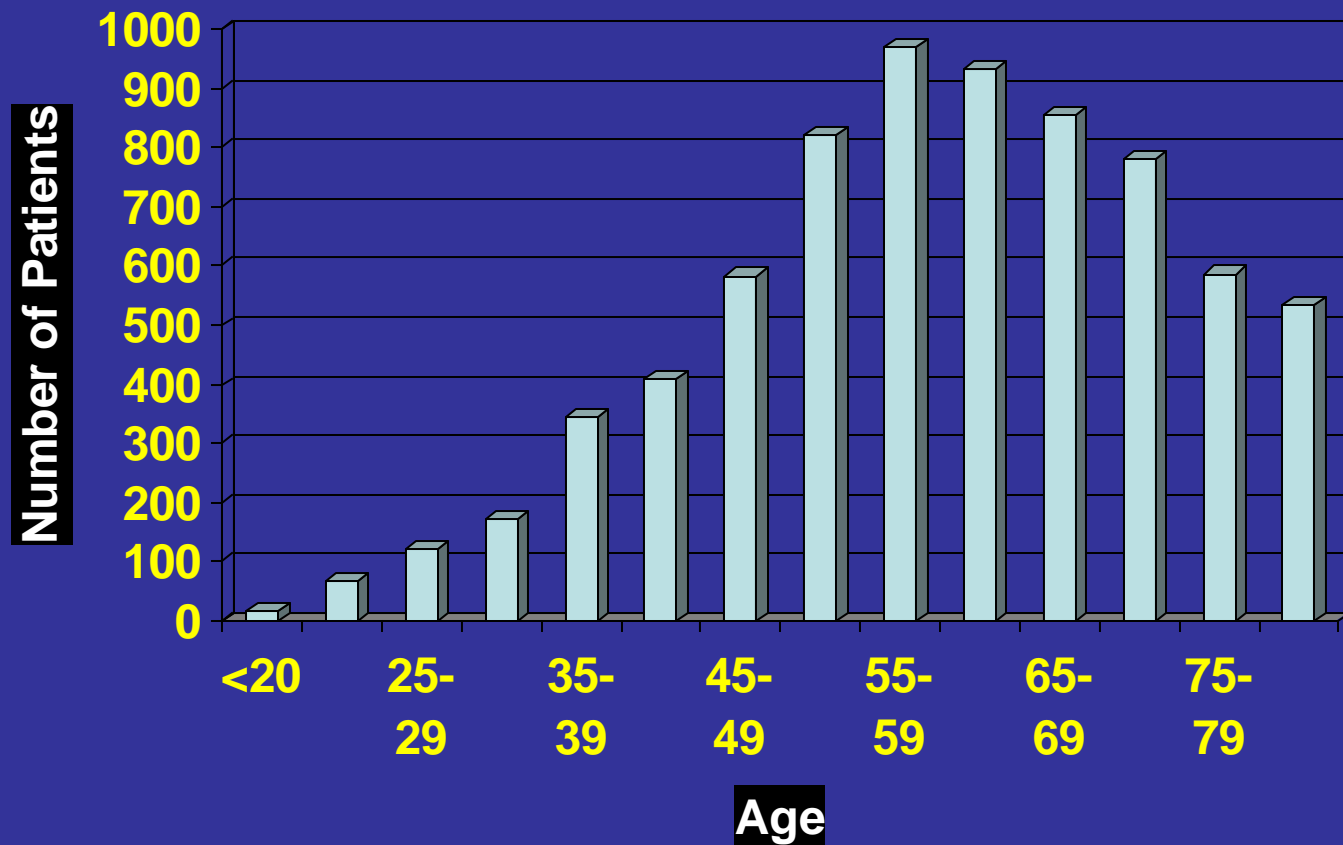
Figure 3: Network 6 Dialysis Facilities Over Time



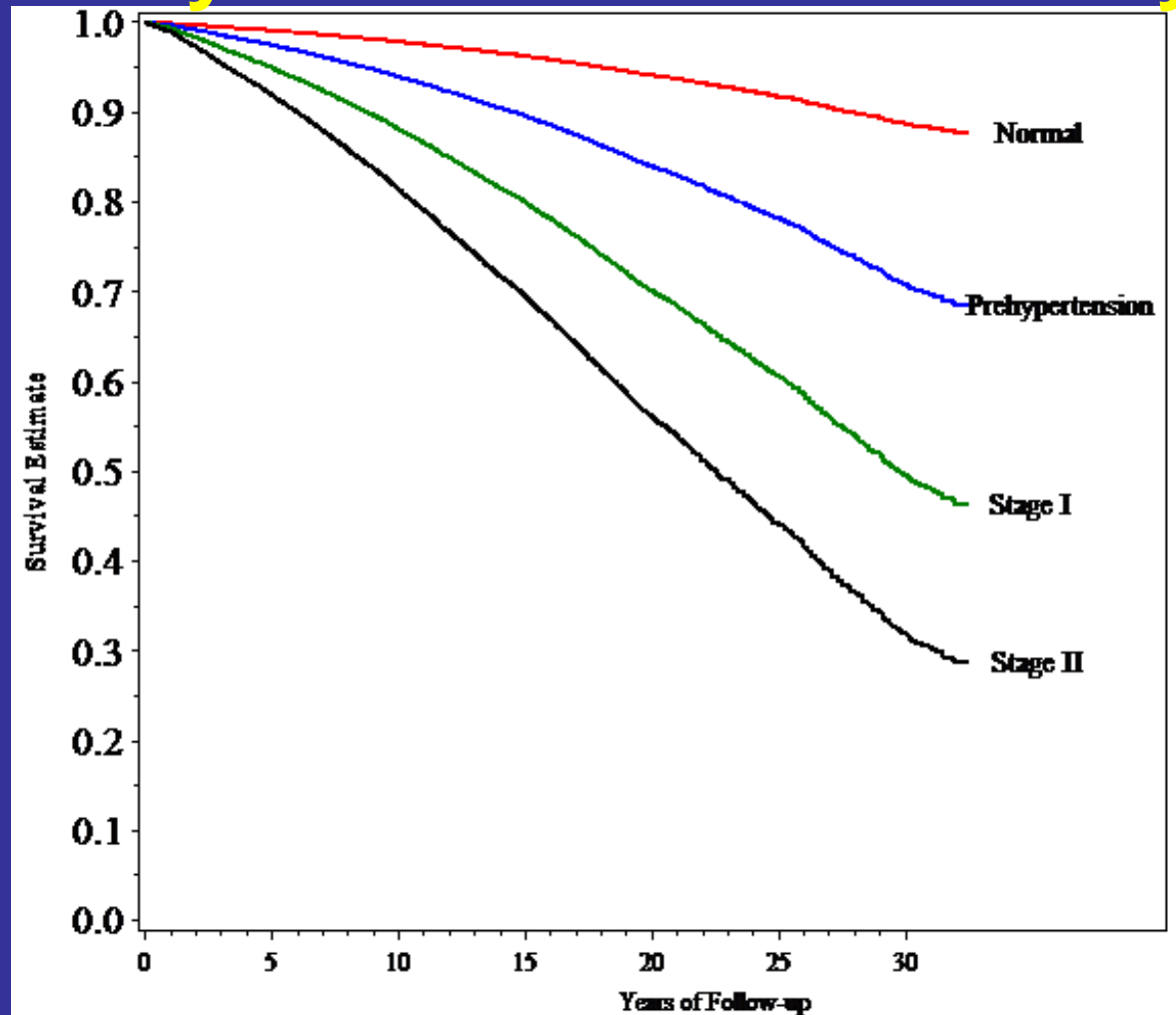
Source: SIMS Database

ESRD Dialysis Patients, SC 2007

N=7199



Survival for Cardiovascular Disease by Hypertension Categories: Evans County/Charleston Heart Study



Lackland DT American Society Hypertension 2007

30-year mortality risk ratios for elevated blood pressure

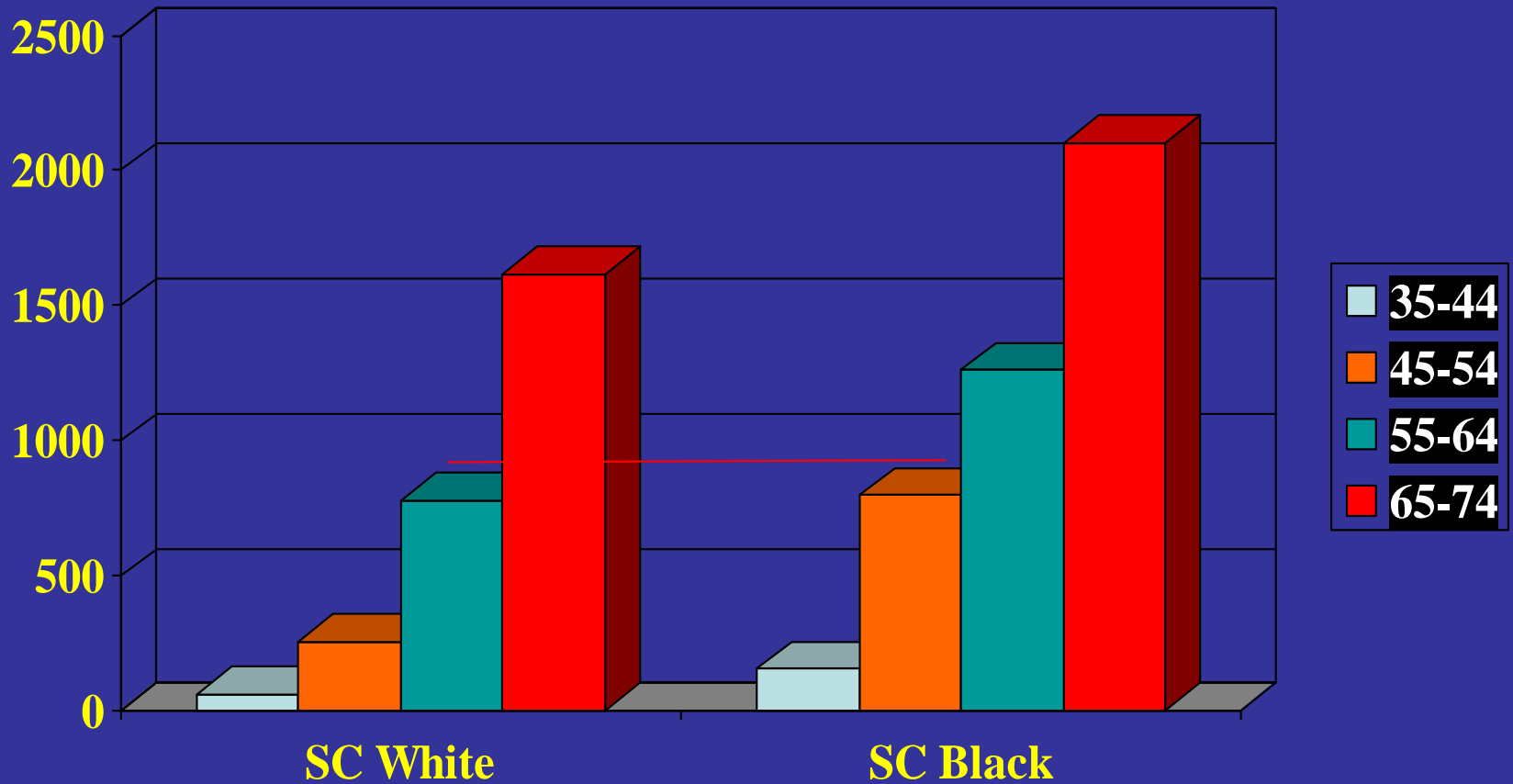
	White Males	White Females	Black Males	Black Females
140/90	1.6 (1.2, 2.0)	1.4 (1.1, 2.0)	2.1 (1.3, 3.1)	2.0 (1.2, 2.8)
160/95	1.8 (1.3, 2.2)	2.0 (1.2, 2.6)	2.4 (1.5, 3.5)	2.4 (1.6, 3.2)

30-year Population Attributable Risks for Hypertension: Charleston and Evans County Heart Study

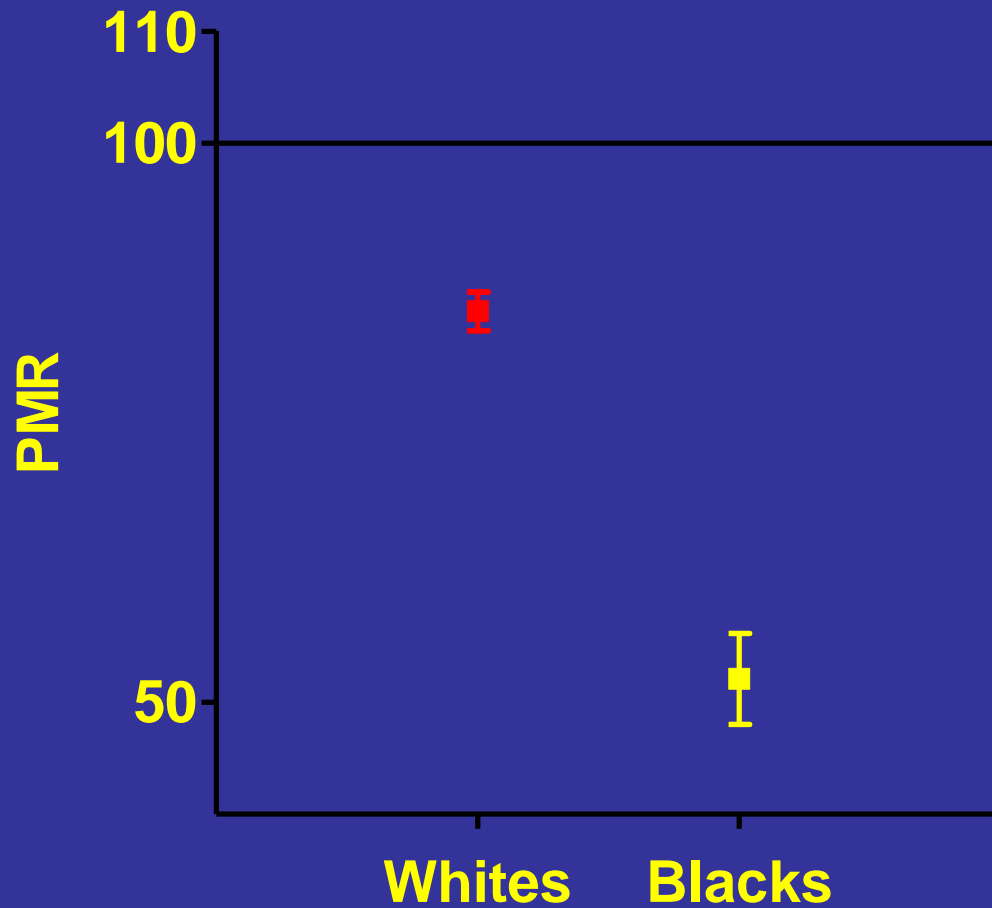
White Males	23.8%
White Females	18.3%
Black Males	45.2%
Black Females	39.5%

Lackland Clinical and Experimental Hypertension, 1995

Stroke Incidence Men, South Carolina



Proportional Mortality Ratios for Stroke: South Carolinians born outside of the Southeast



* Hypertension 1999; 34. 57-62

Disparities

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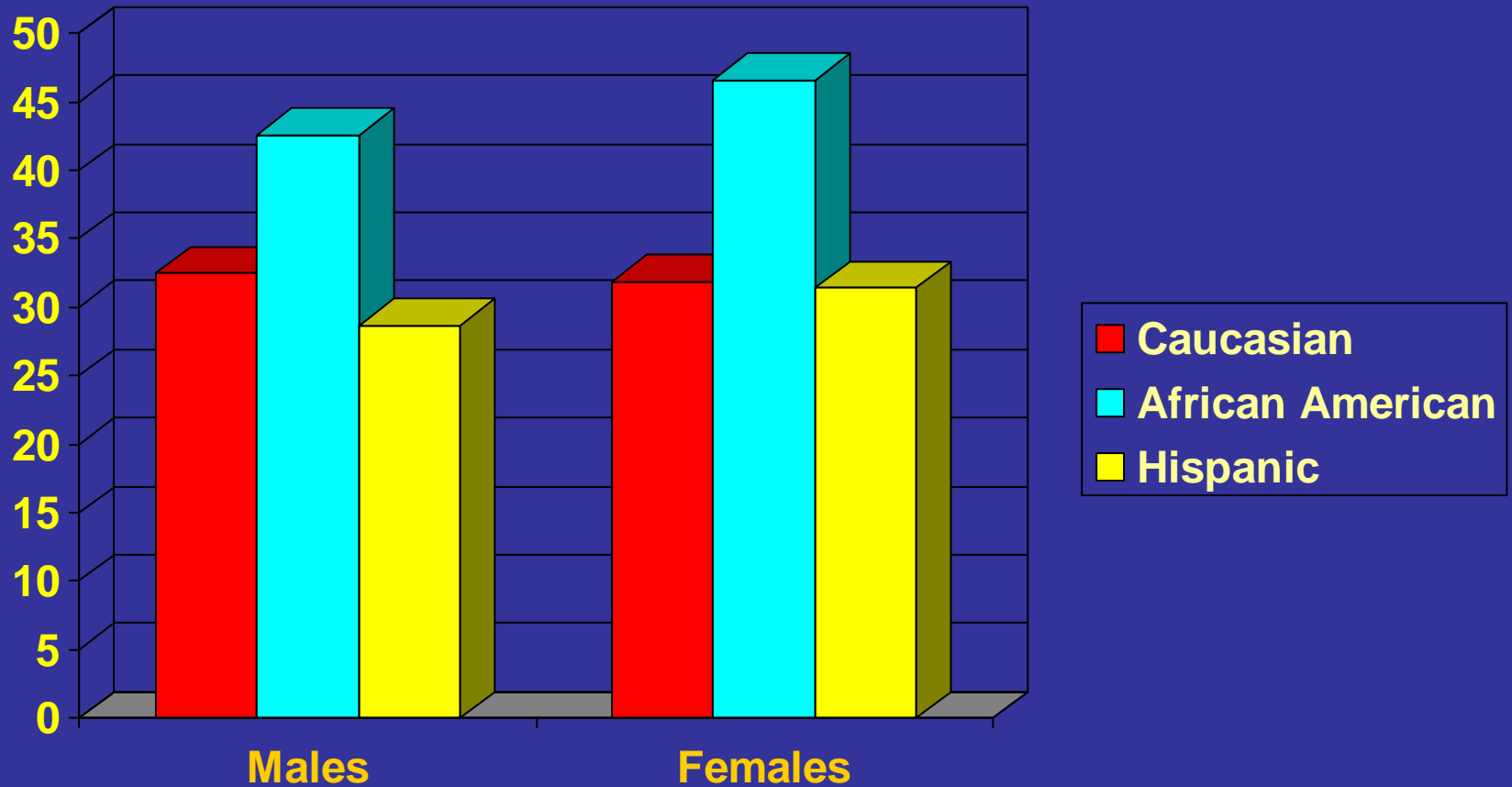
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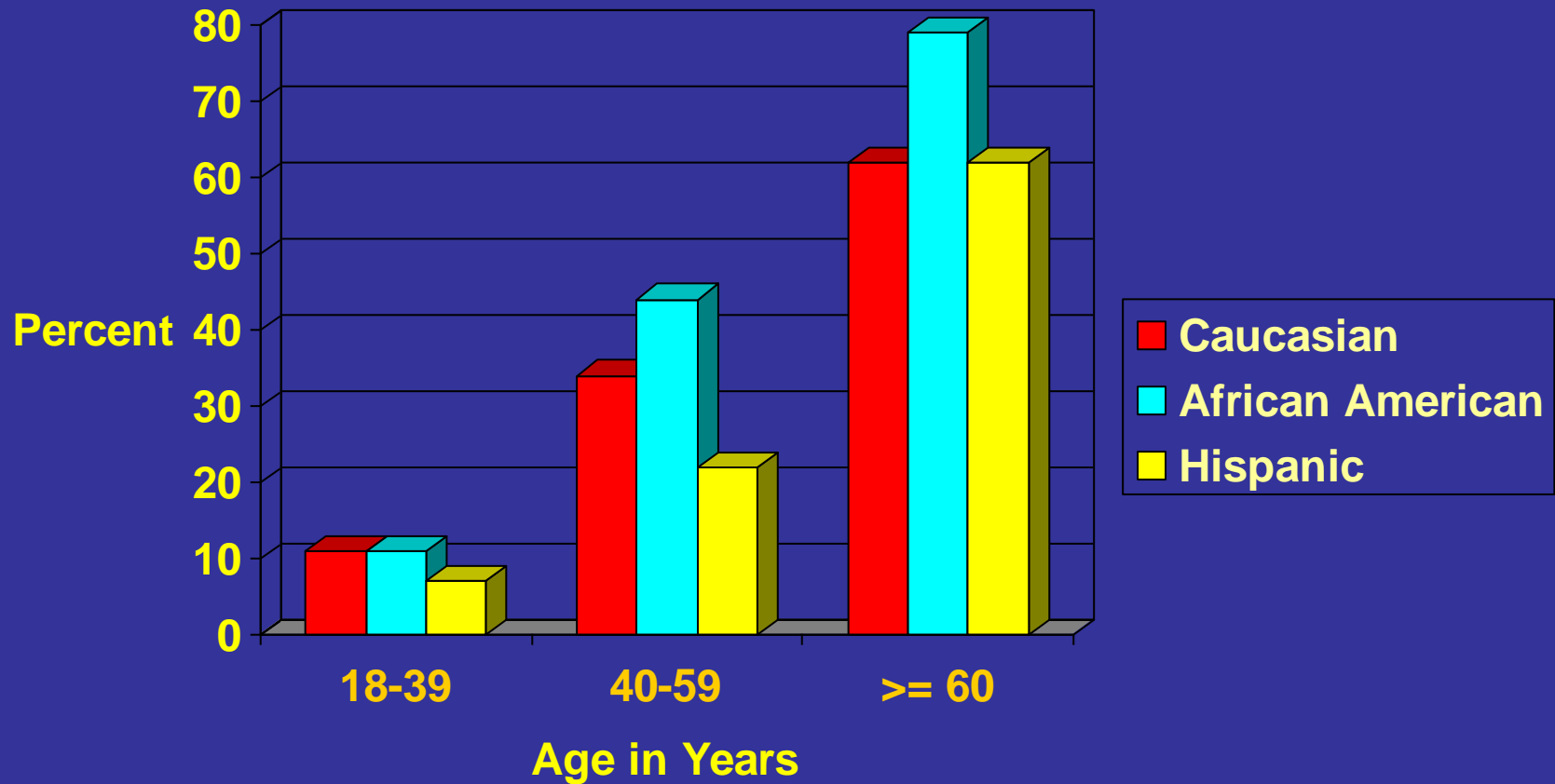
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Prevalence of Hypertension

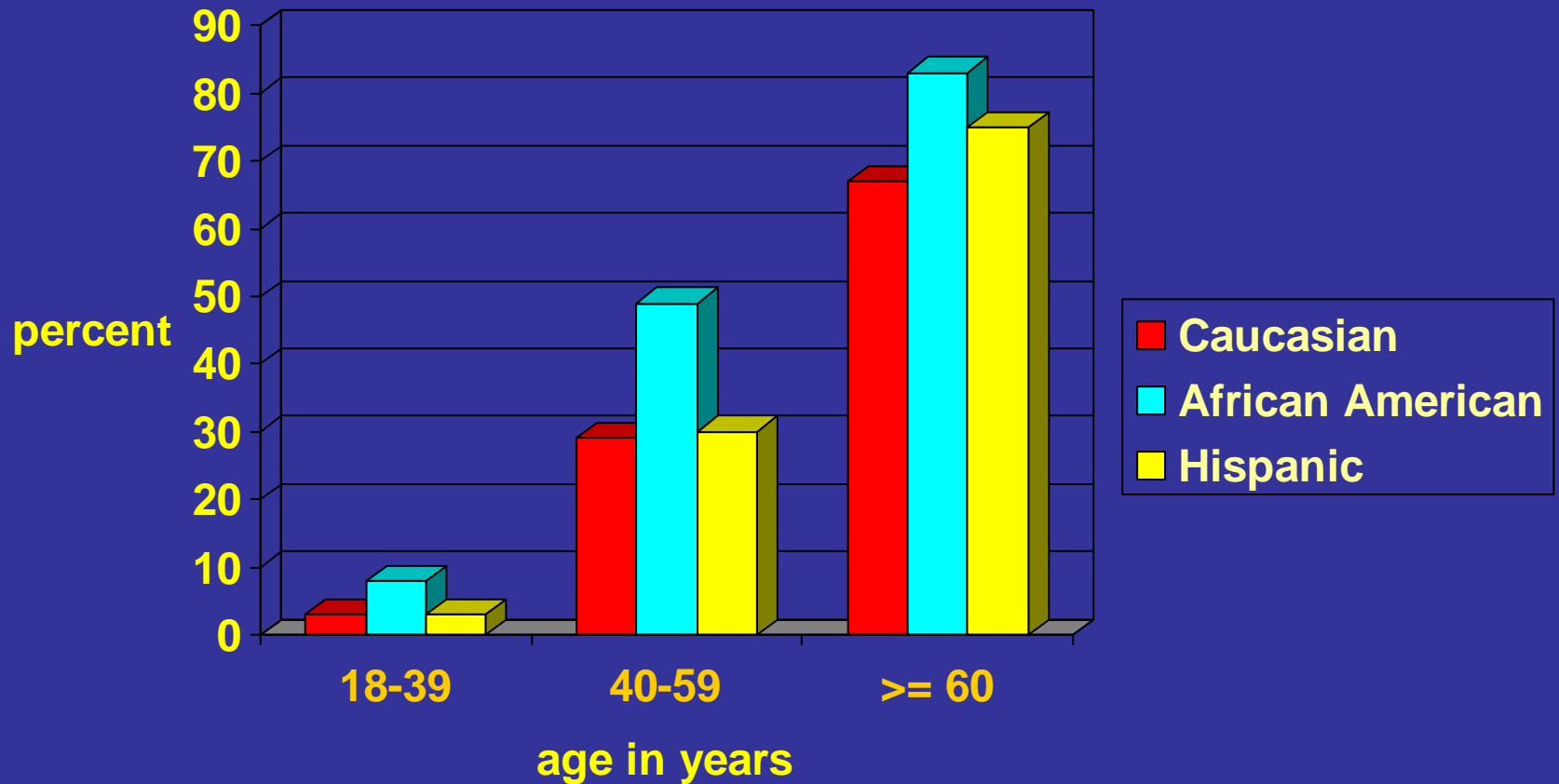


Prevalence of Hypertension Males



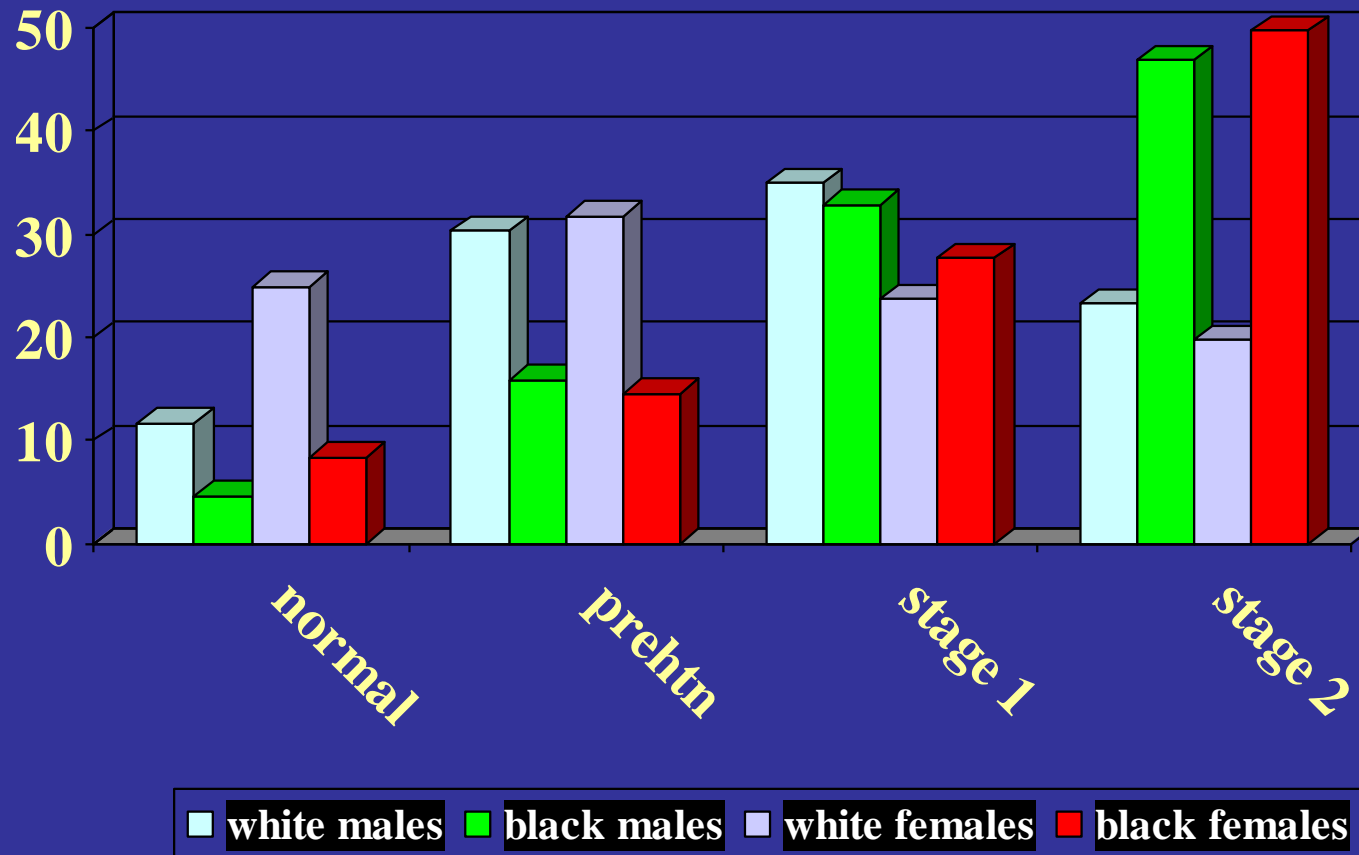
Hypertension 2007; 49: 69-75

Prevalence of Hypertension Females



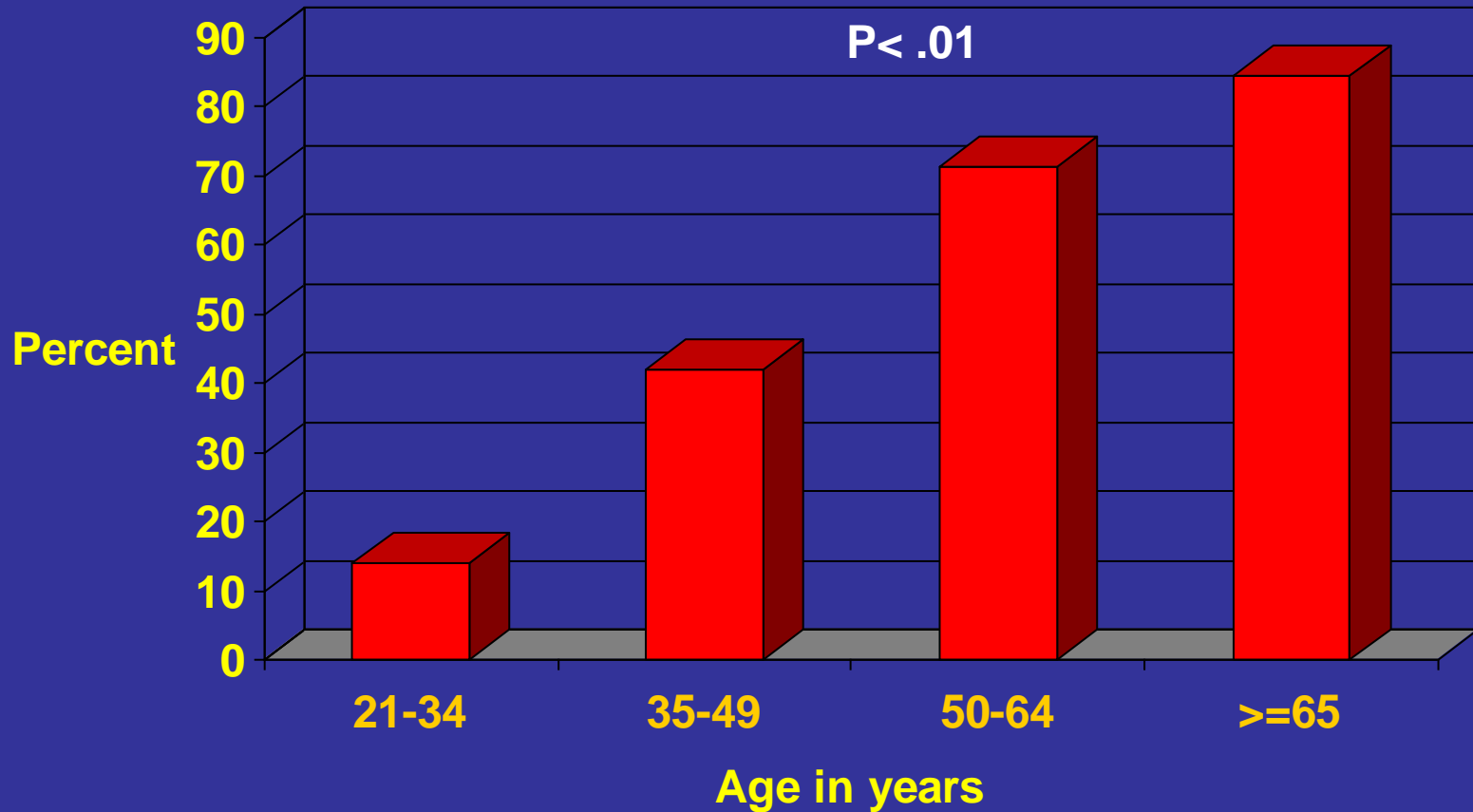
Hypertension 2007; 49: 69-75

Blood Pressure Levels



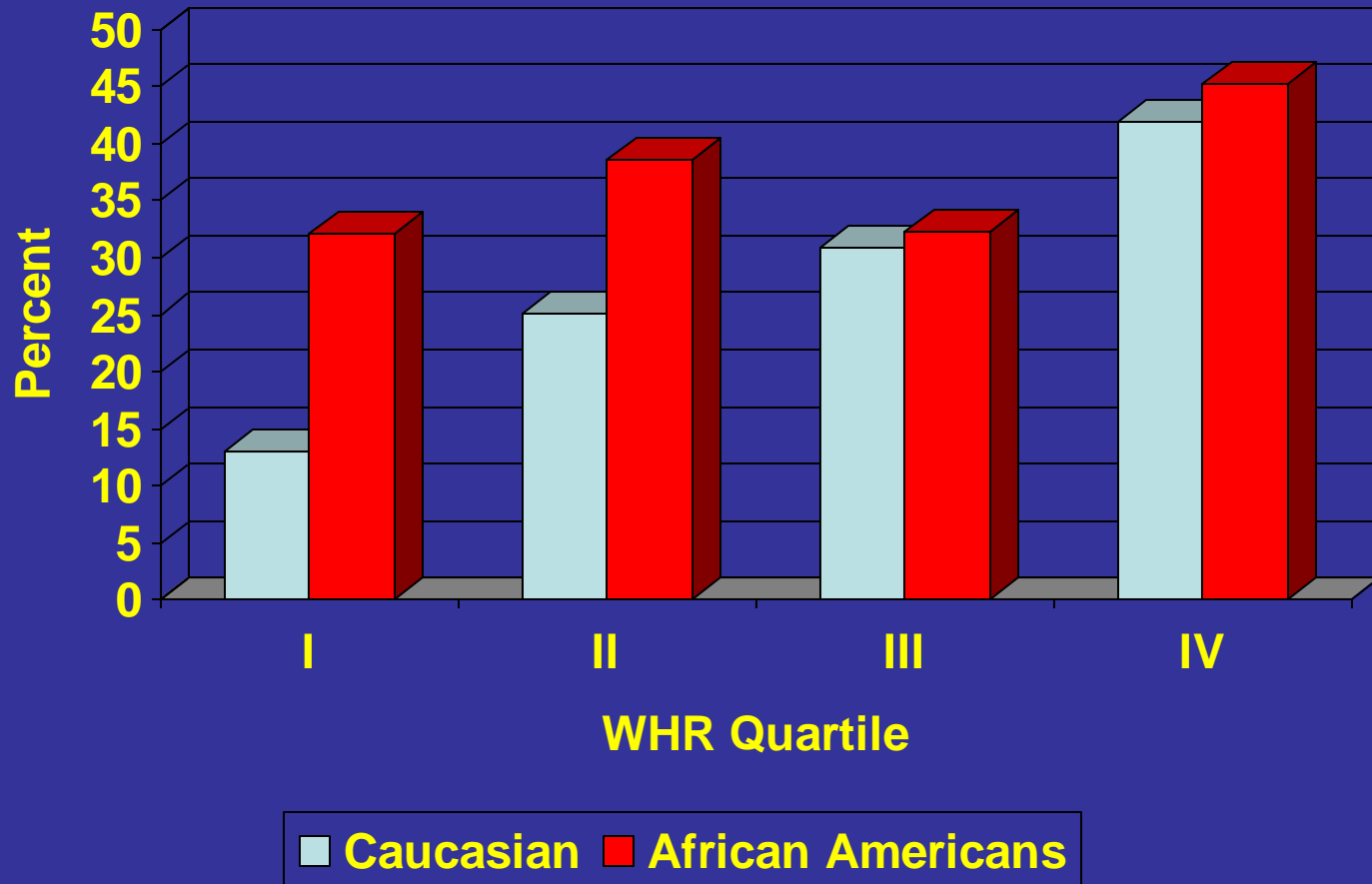
Lackland, 2005

Prevalence hypertension African Americans

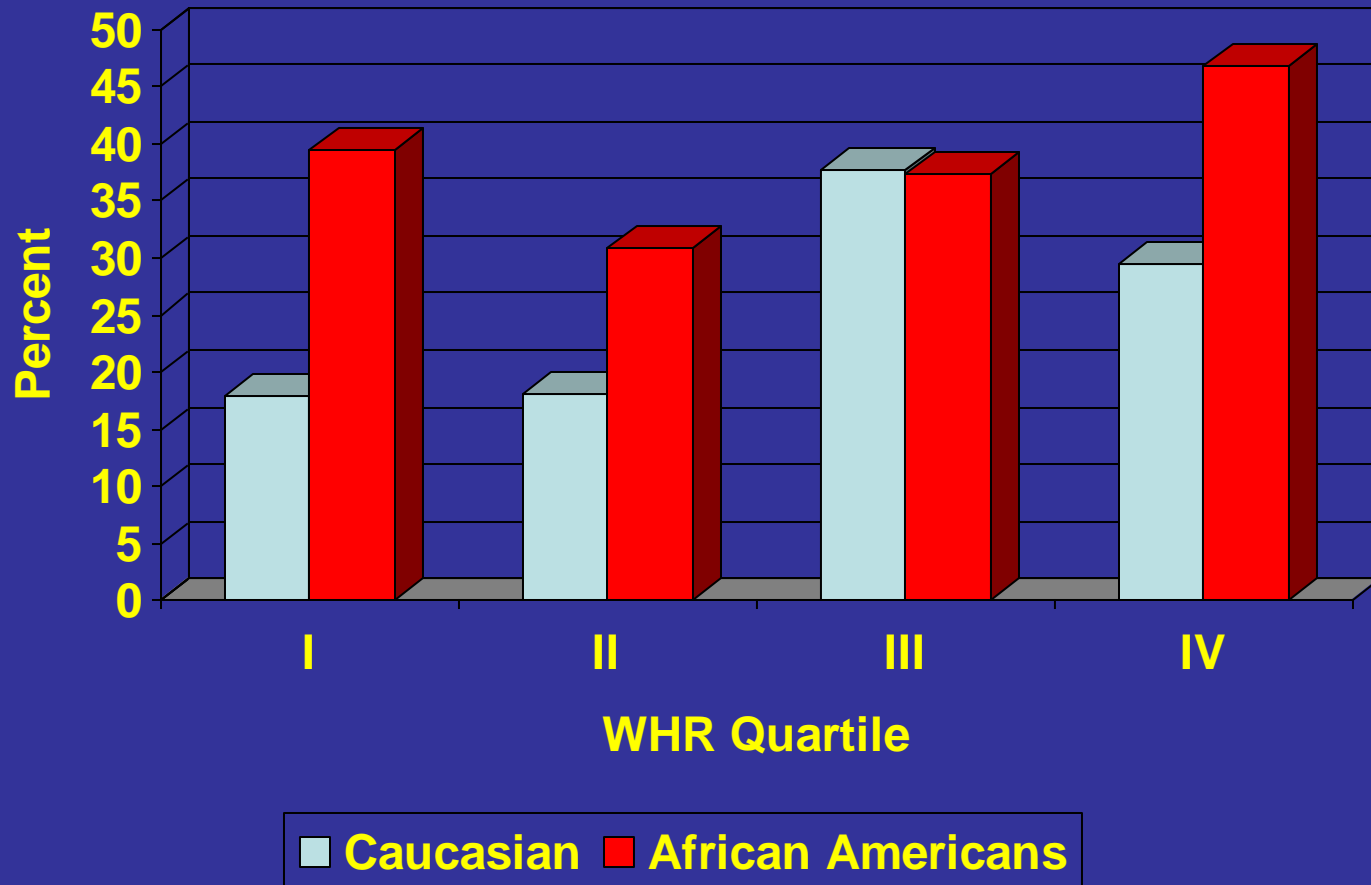


Wyatt SB, et. al. Hypertension 2008; 51:650-656

Hypertension by Waist to Hip Ratio Males



Hypertension by Waist to Hip Ratio Females



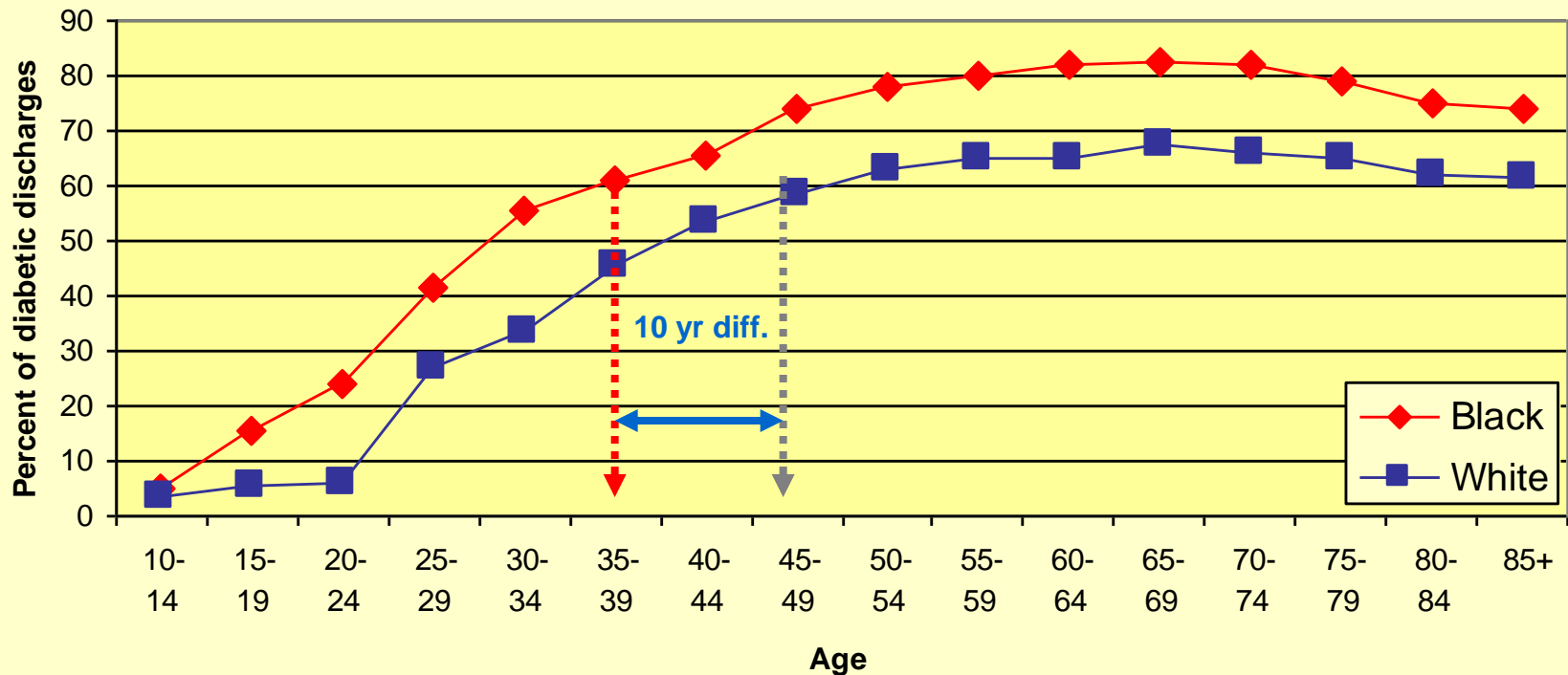
Hgb A1c By Hypertension Status among Diabetics

	Hypertensive	Non-Hypertensive
White Males	8.55	8.09
White Females	8.28	6.45
Black Males	10.25	9.63
Black Females	10.64	7.92

Hypertension among Hospitalized Diabetic Patients

- SC Diabetes Hospitalization Database:

Hypertension among Diabetic Discharges

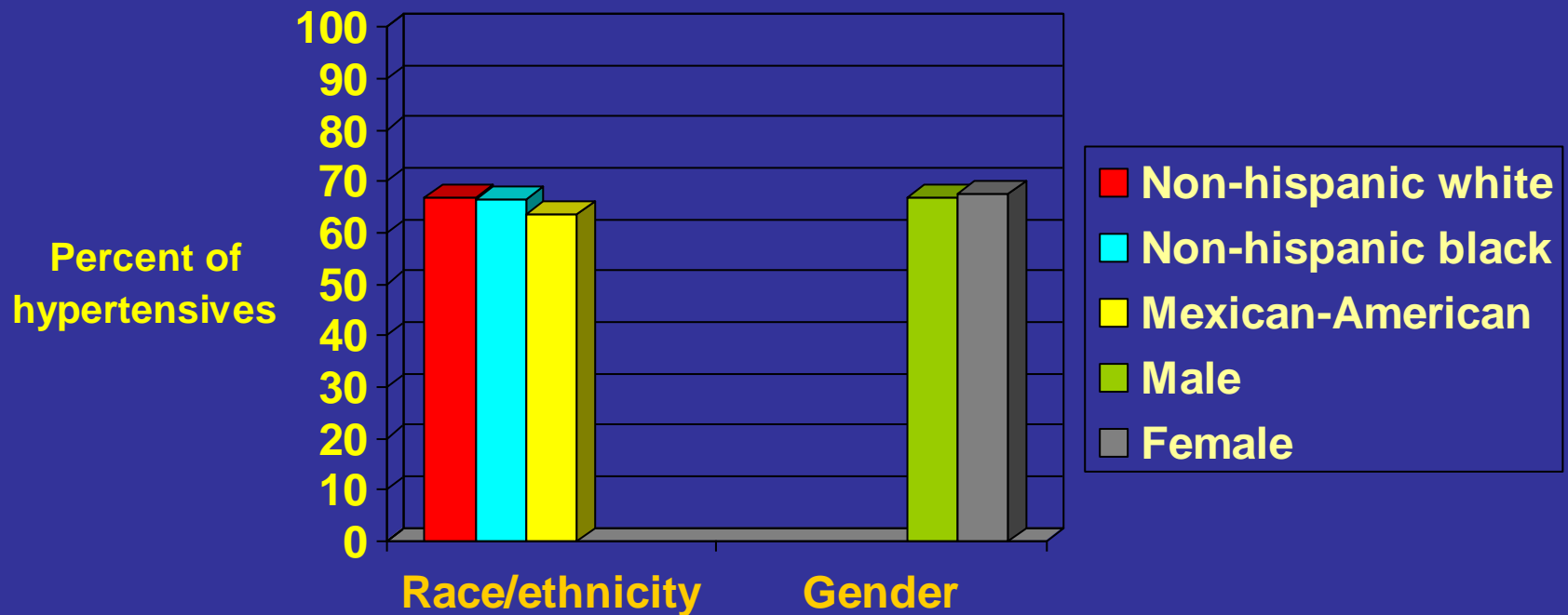


Source: Mountford et al. 2006 Consortium for Southeastern Hypertension Control Meeting

Disparities

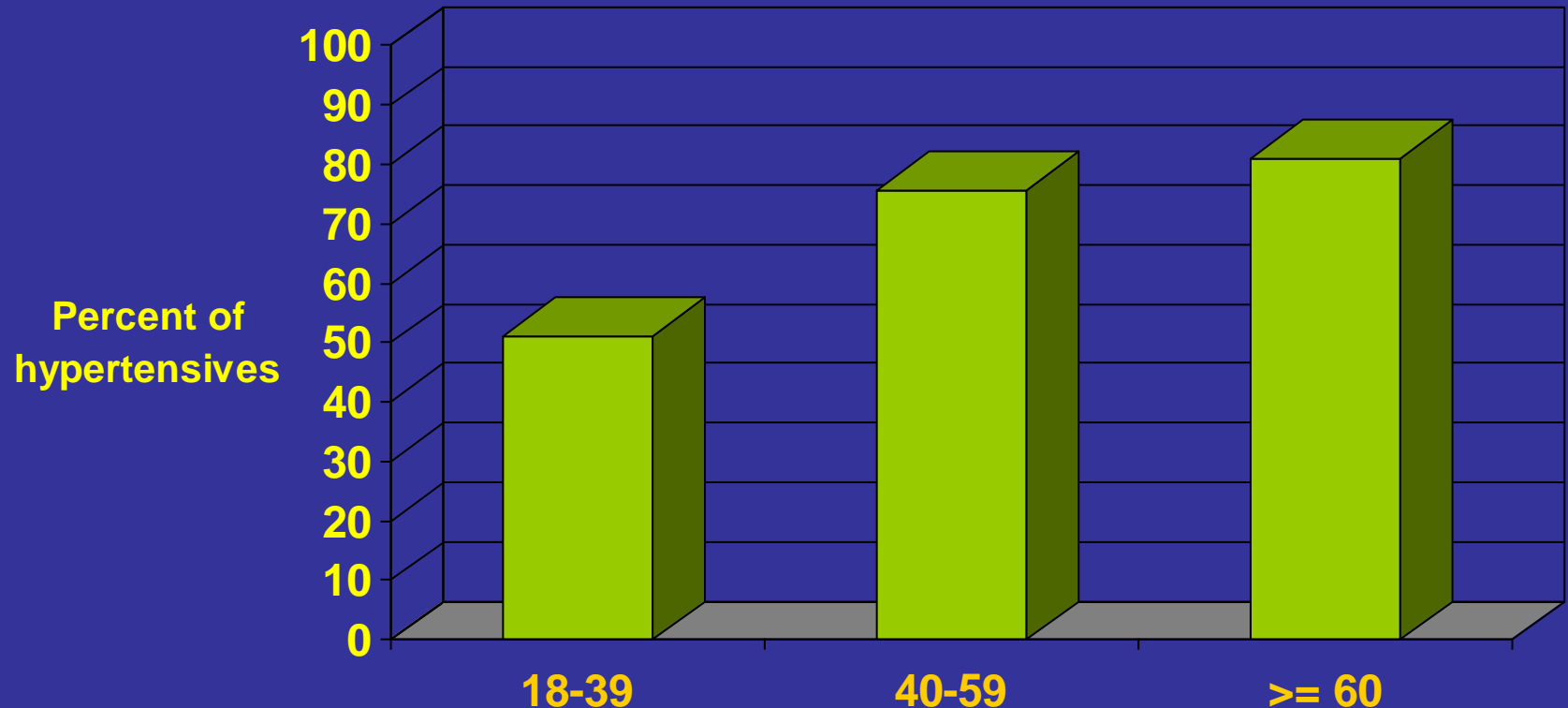
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Awareness of Hypertension



Hypertension 2007; 49:69-75

Awareness of Hypertension

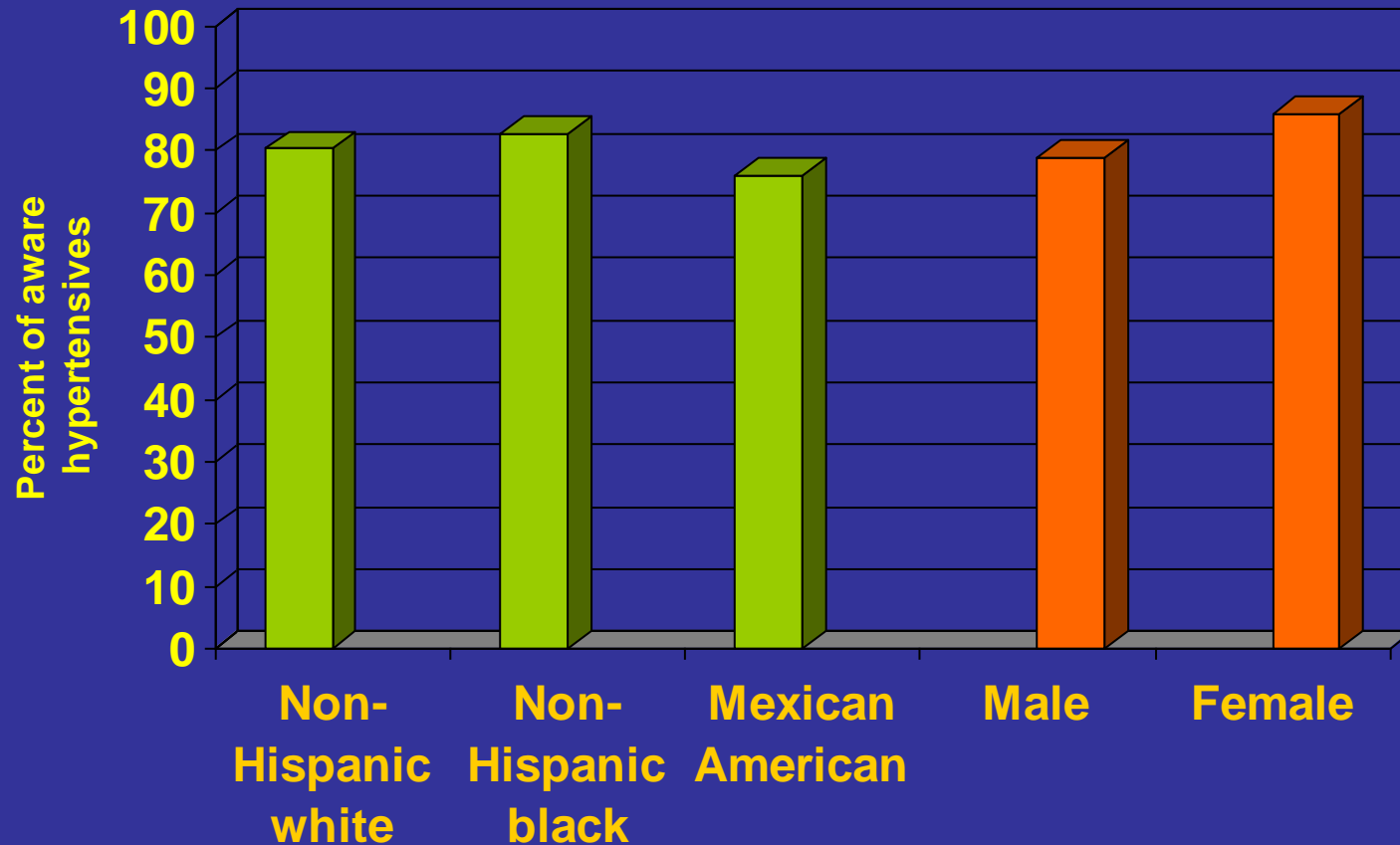


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Disparities

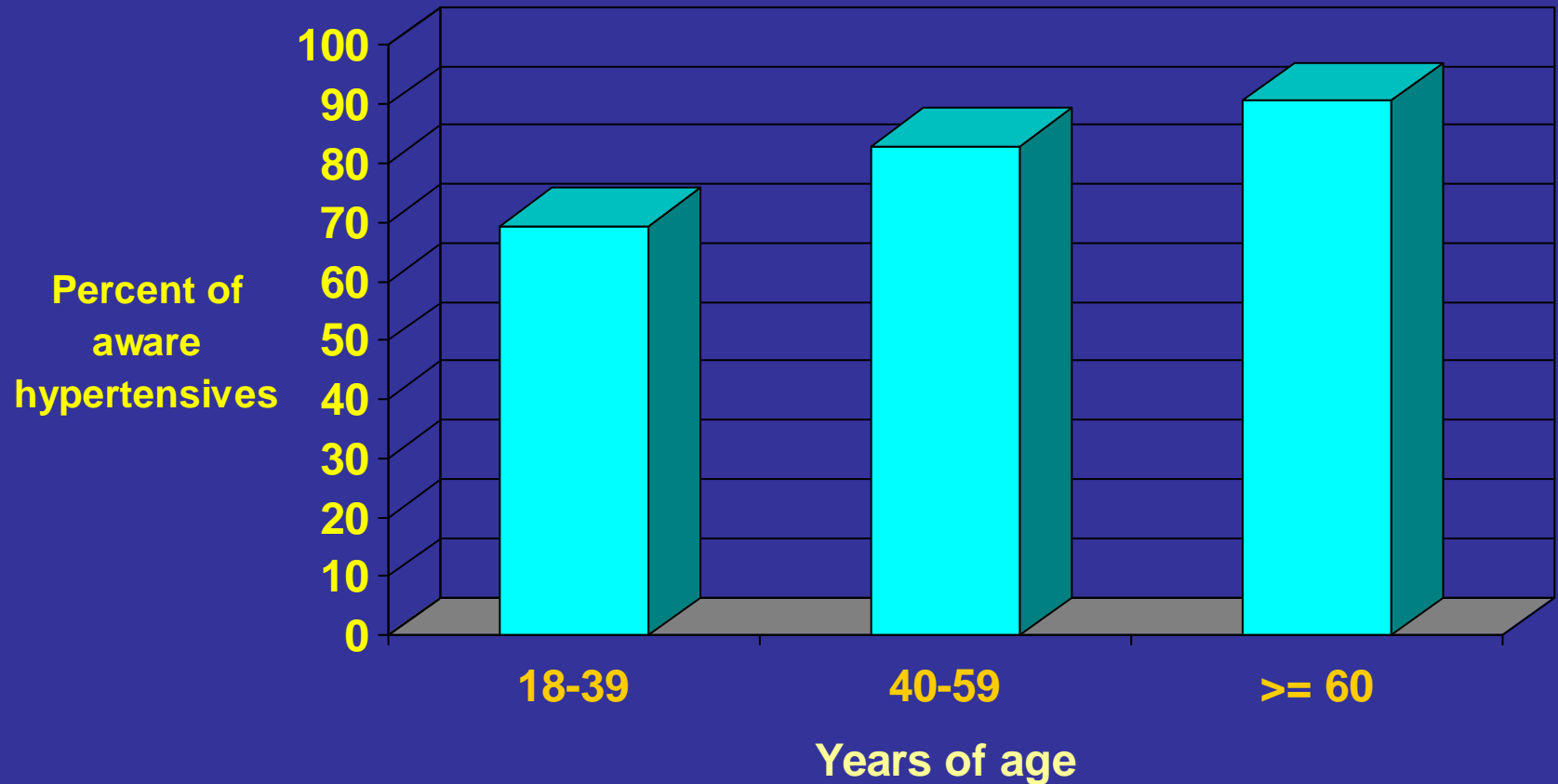
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Treatment of Hypertension



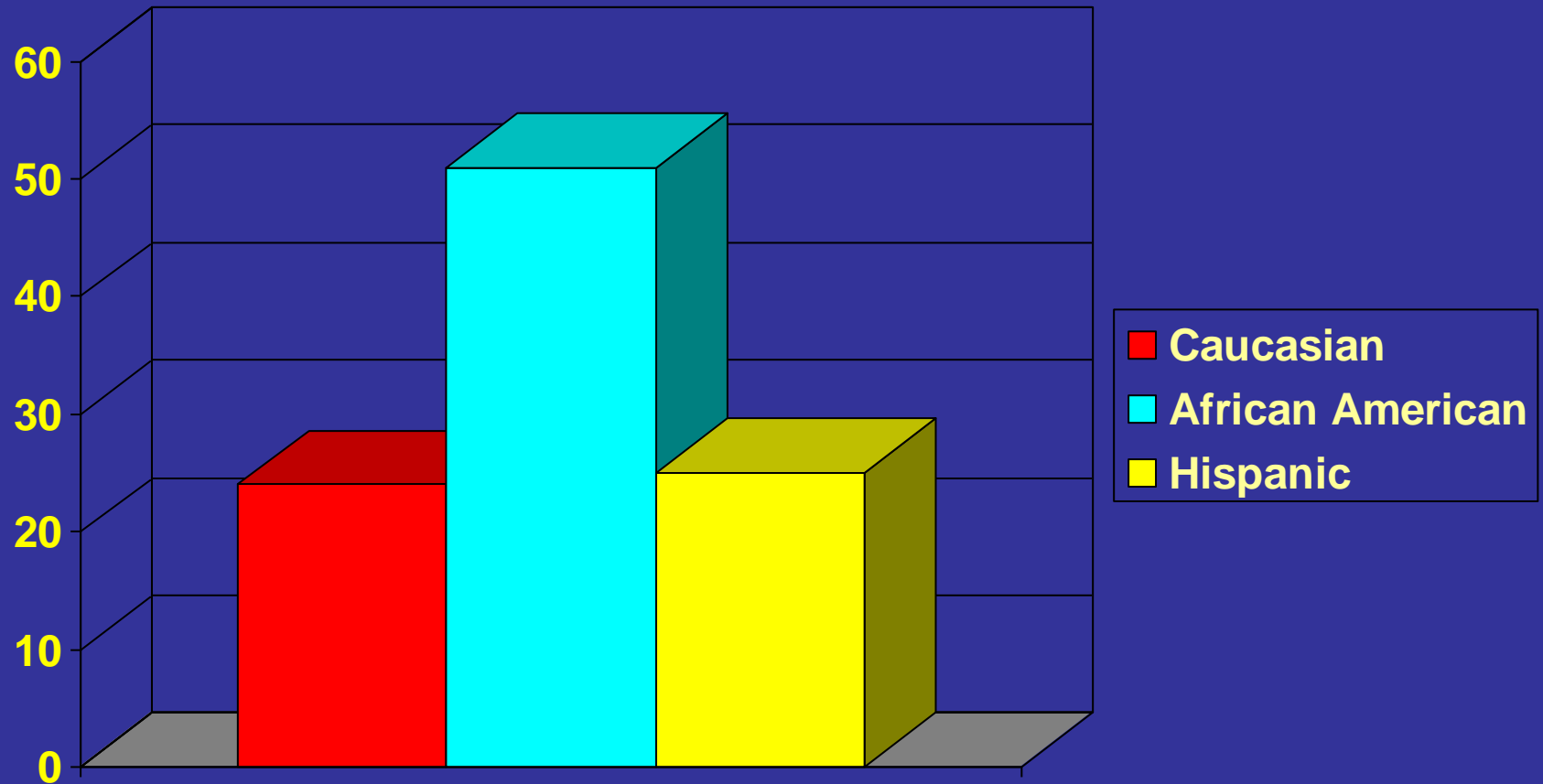
Hypertension 2007; 49:69-75

Treatment of Hypertension



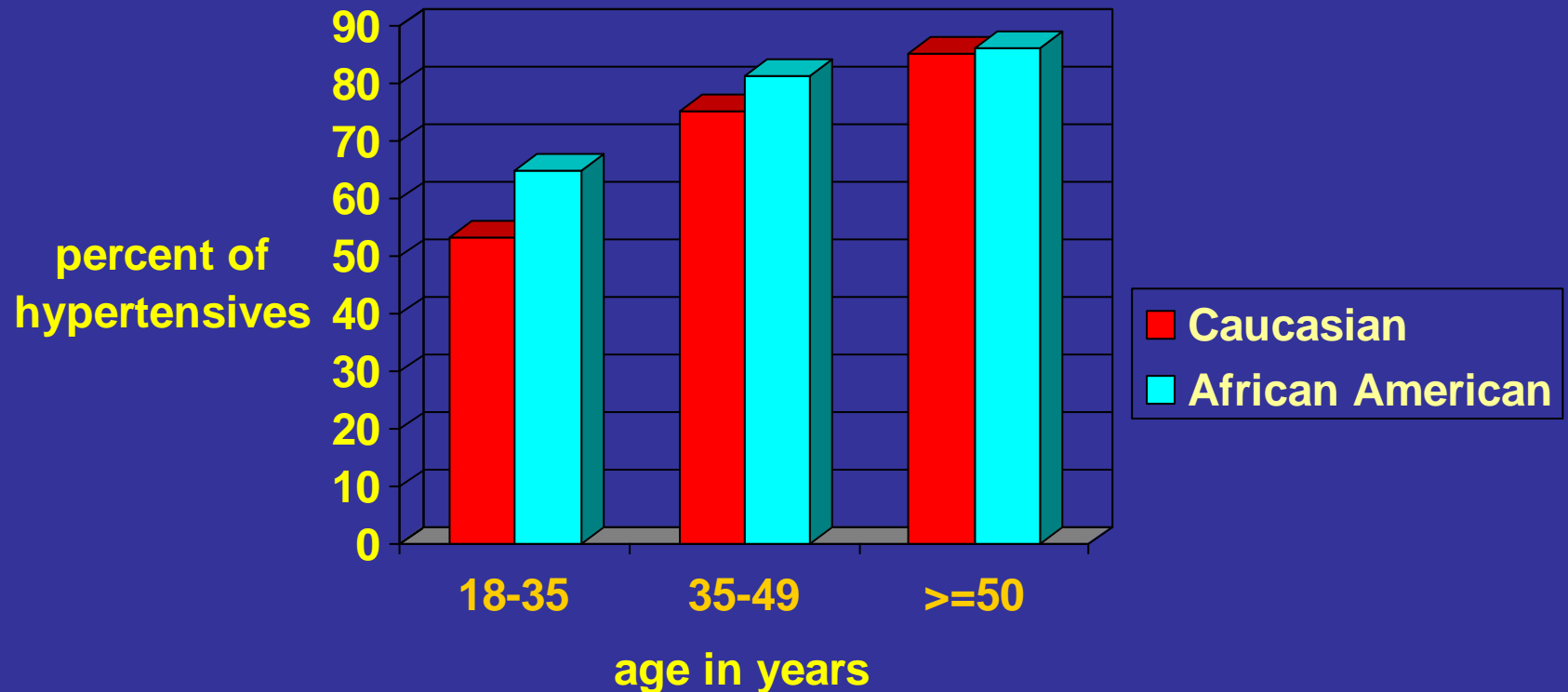
Hypertension 2007; 49:69-75

Older Americans reporting “medications as only way to treat high blood pressure”

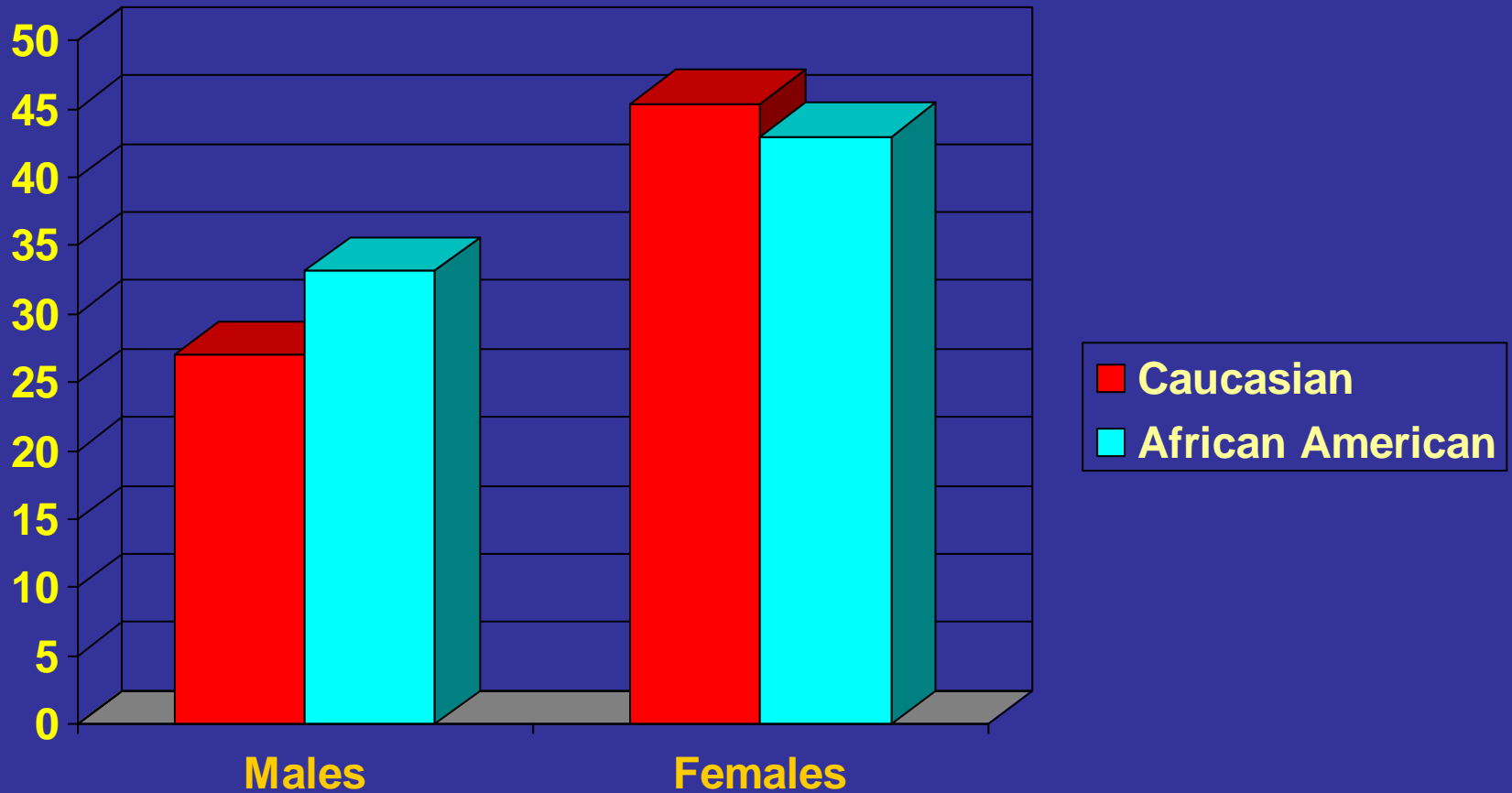


American Journal of Hypertension 2005; 18:972 - 979

Treatment at primary care sites for underserved



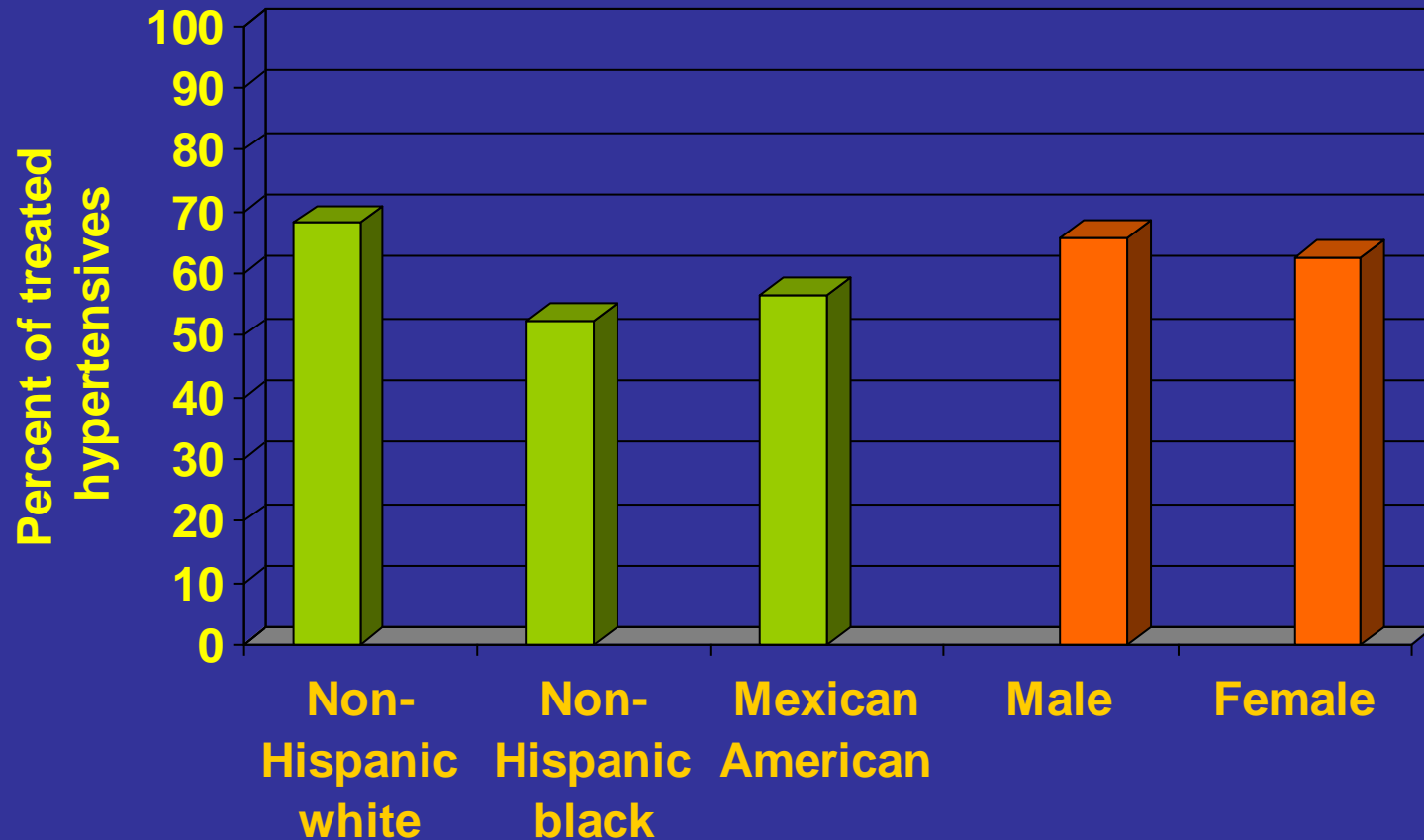
Diagnosed with hyperlipidemia with no drug treatment



Disparities

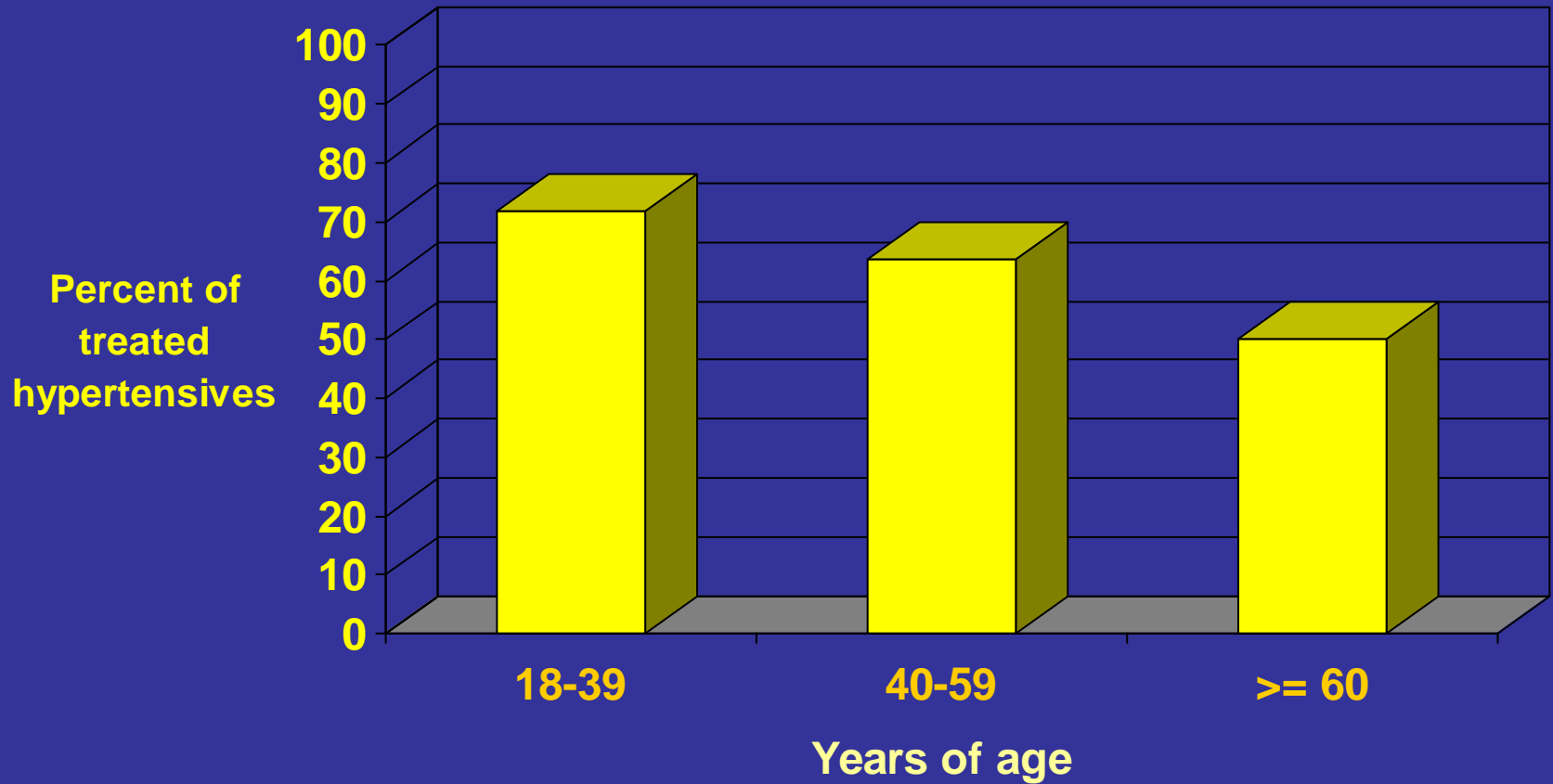
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Control (<140/90 mm hg) of Treated Hypertension



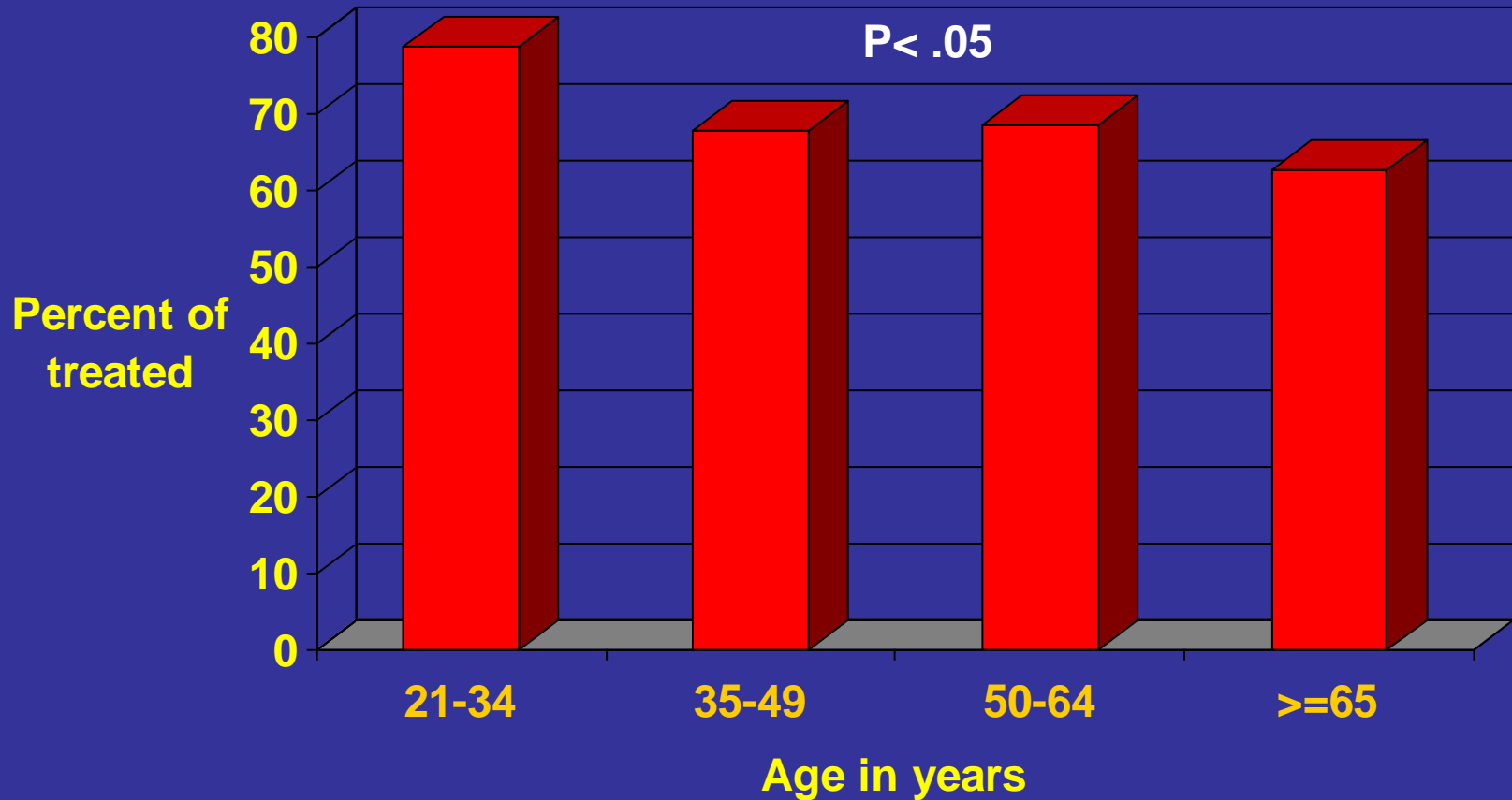
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Control of Hypertension



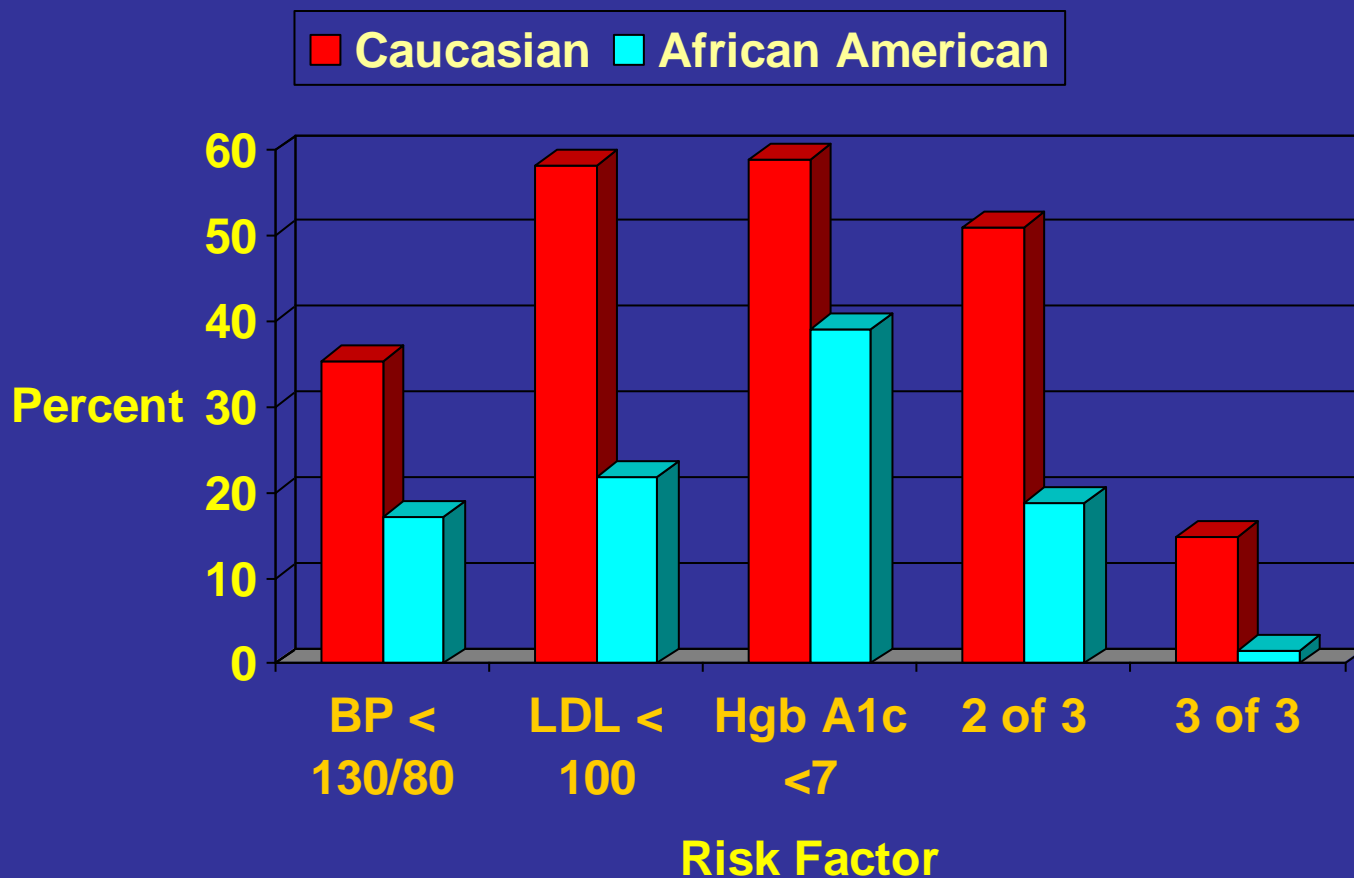
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Control (<140/90 mm hg) of treated hypertensives African Americans

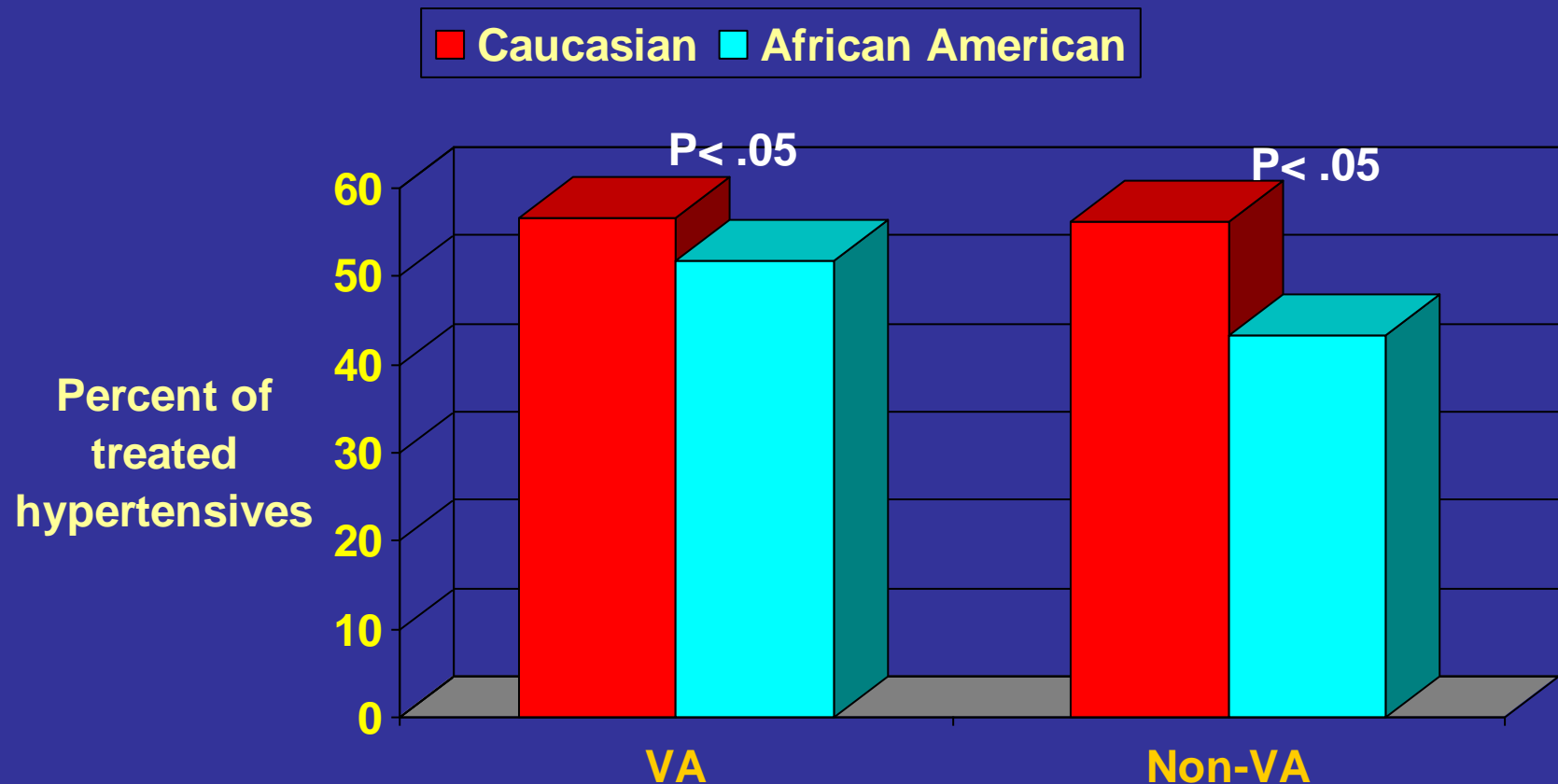


Risk Factor Control

Diabetic Hypertensive Patients with Dyslipidemia



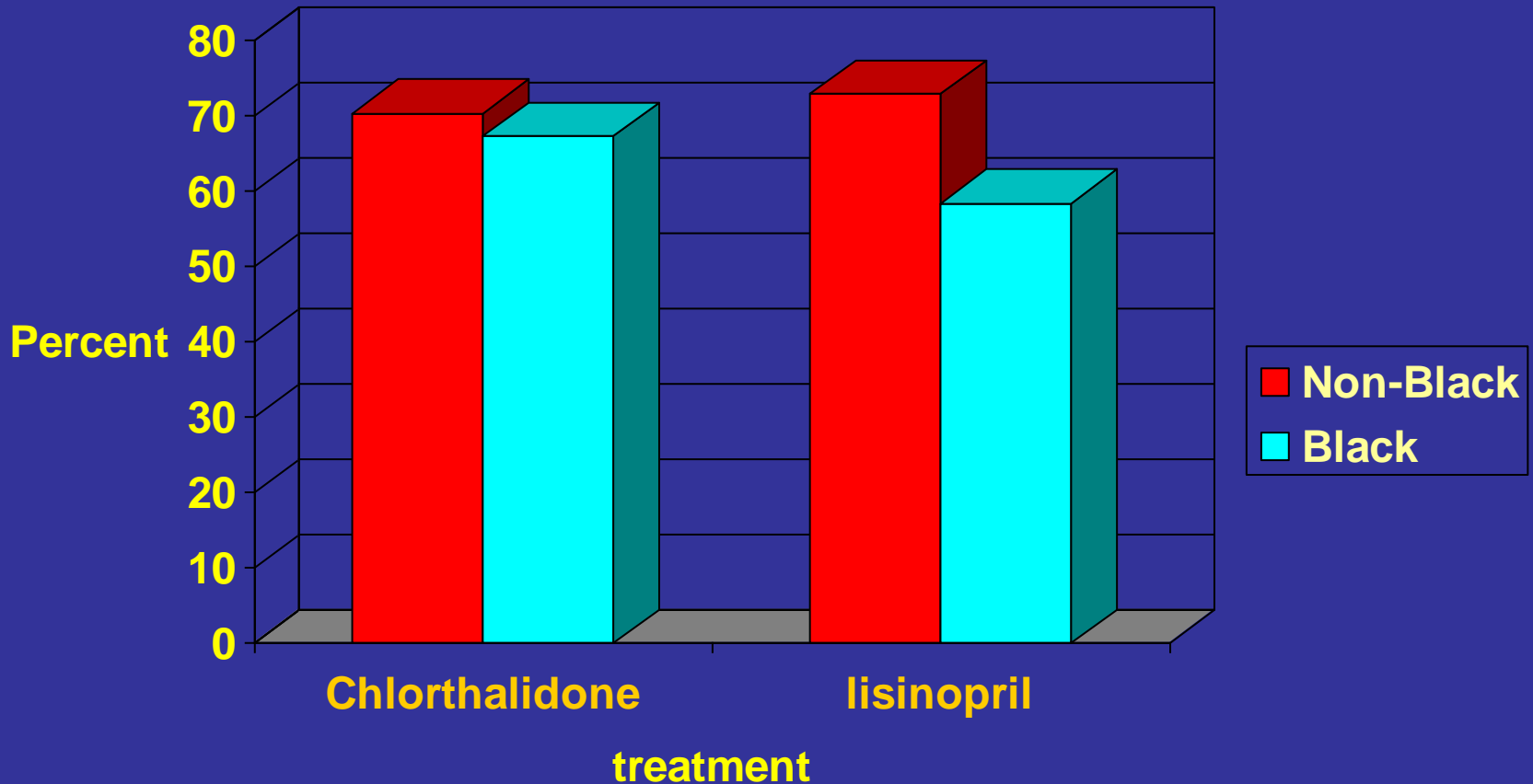
Hypertension Control (< 140/90 mm hg) by VA and Non-VA-Males



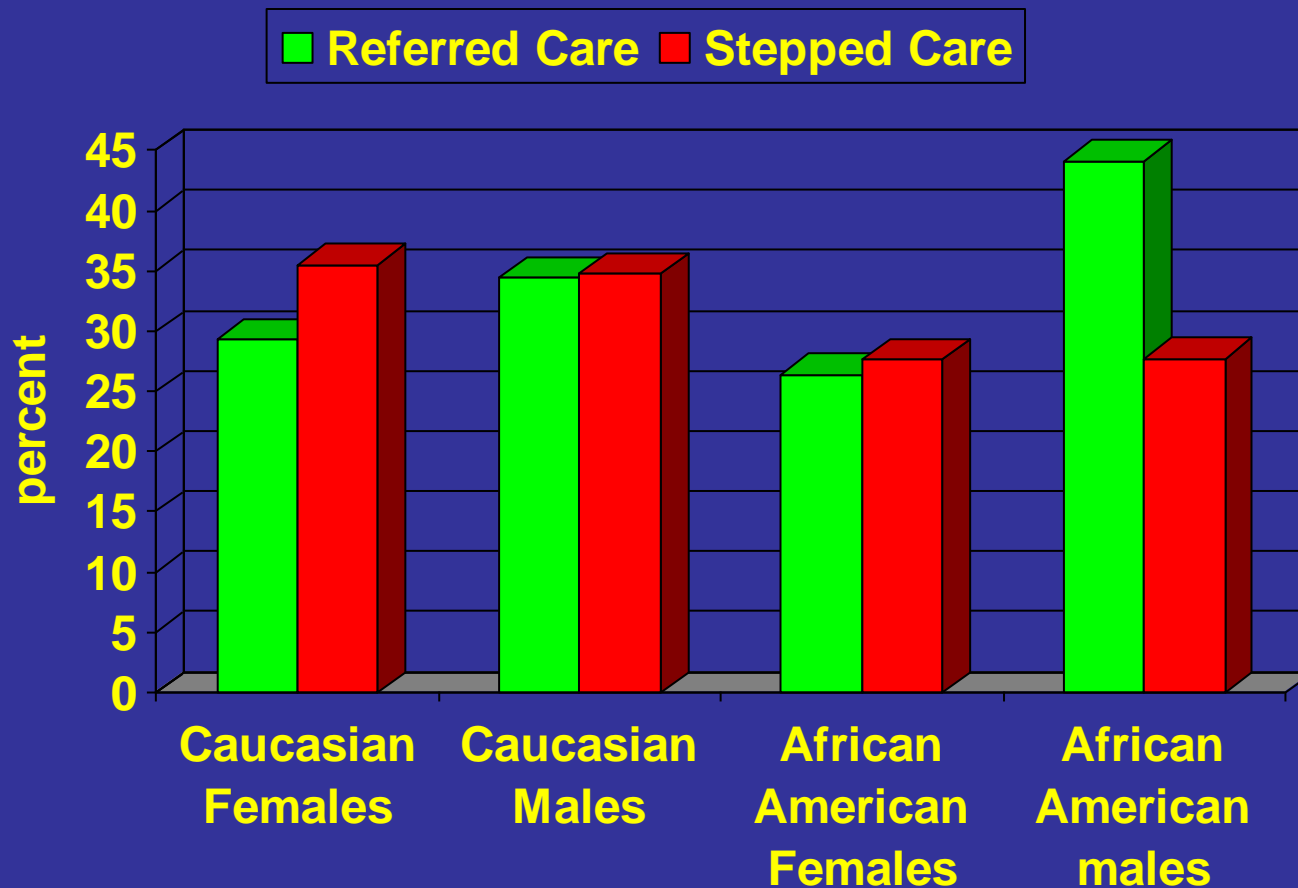
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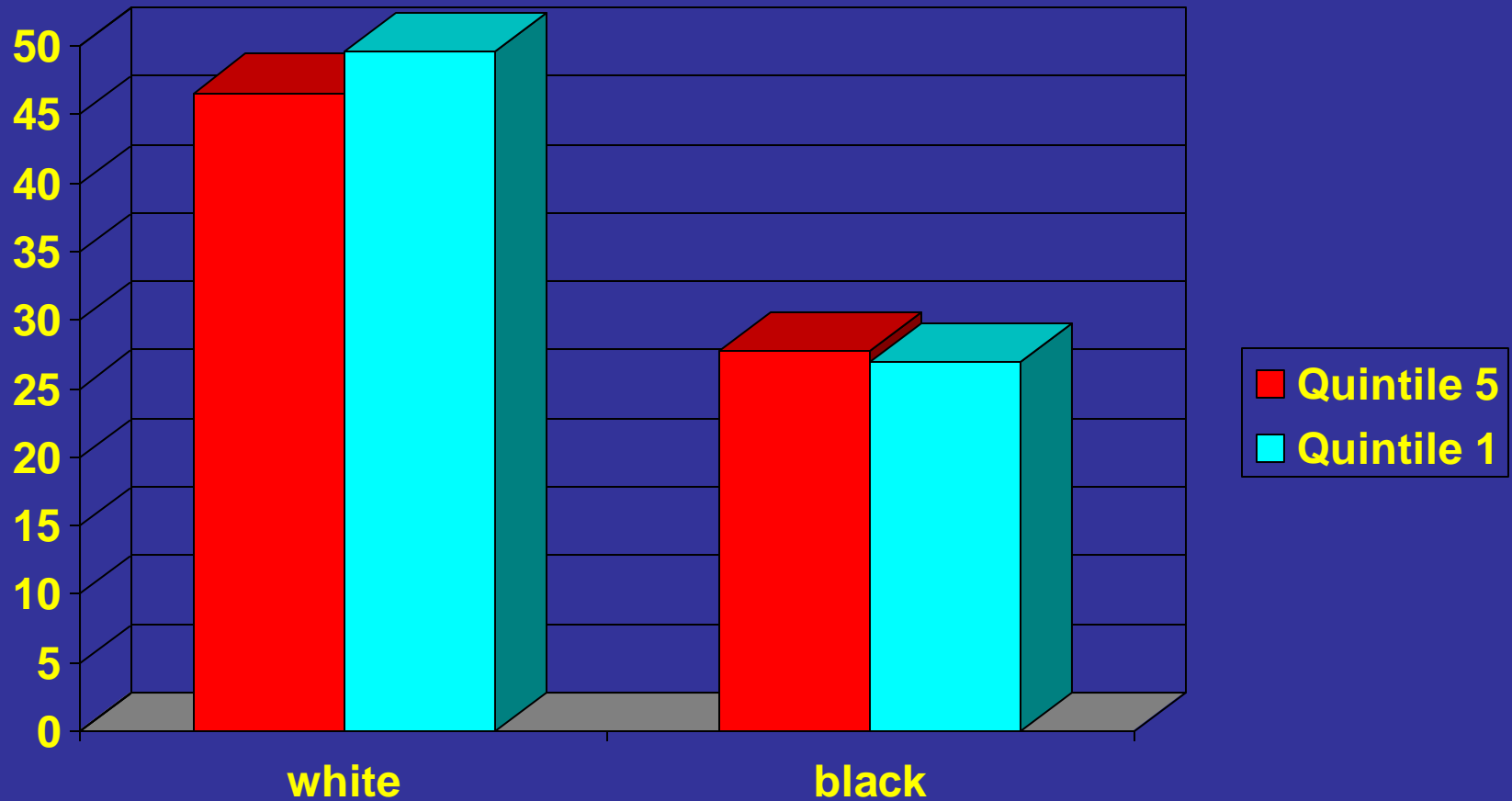
Percent at goal blood pressure (<140/90 mm hg) at 6-years follow-up



30-year cardiovascular disease mortality: Hypertension Detection and Follow-up Program-GA



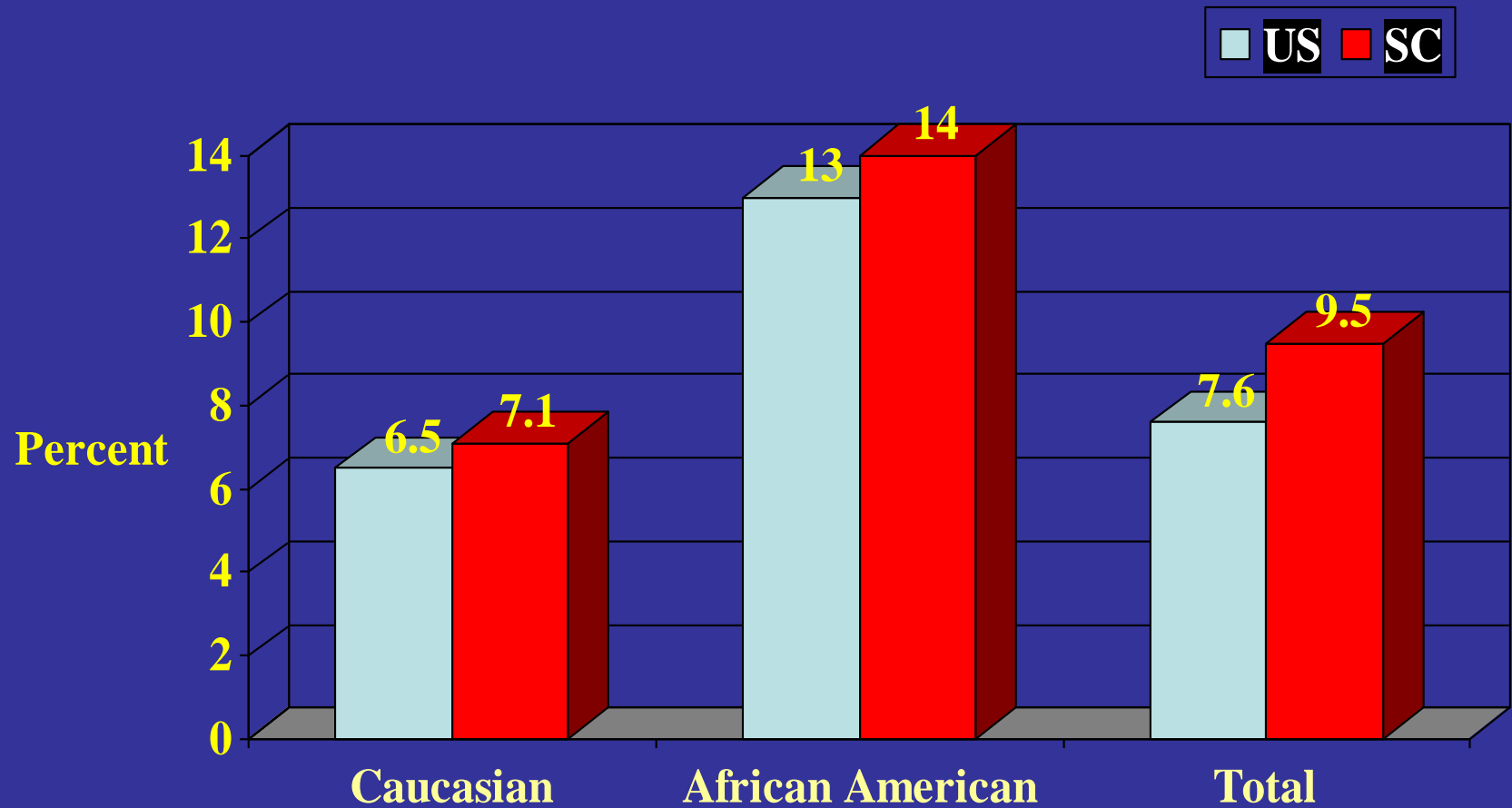
Therapeutic Inertia Score



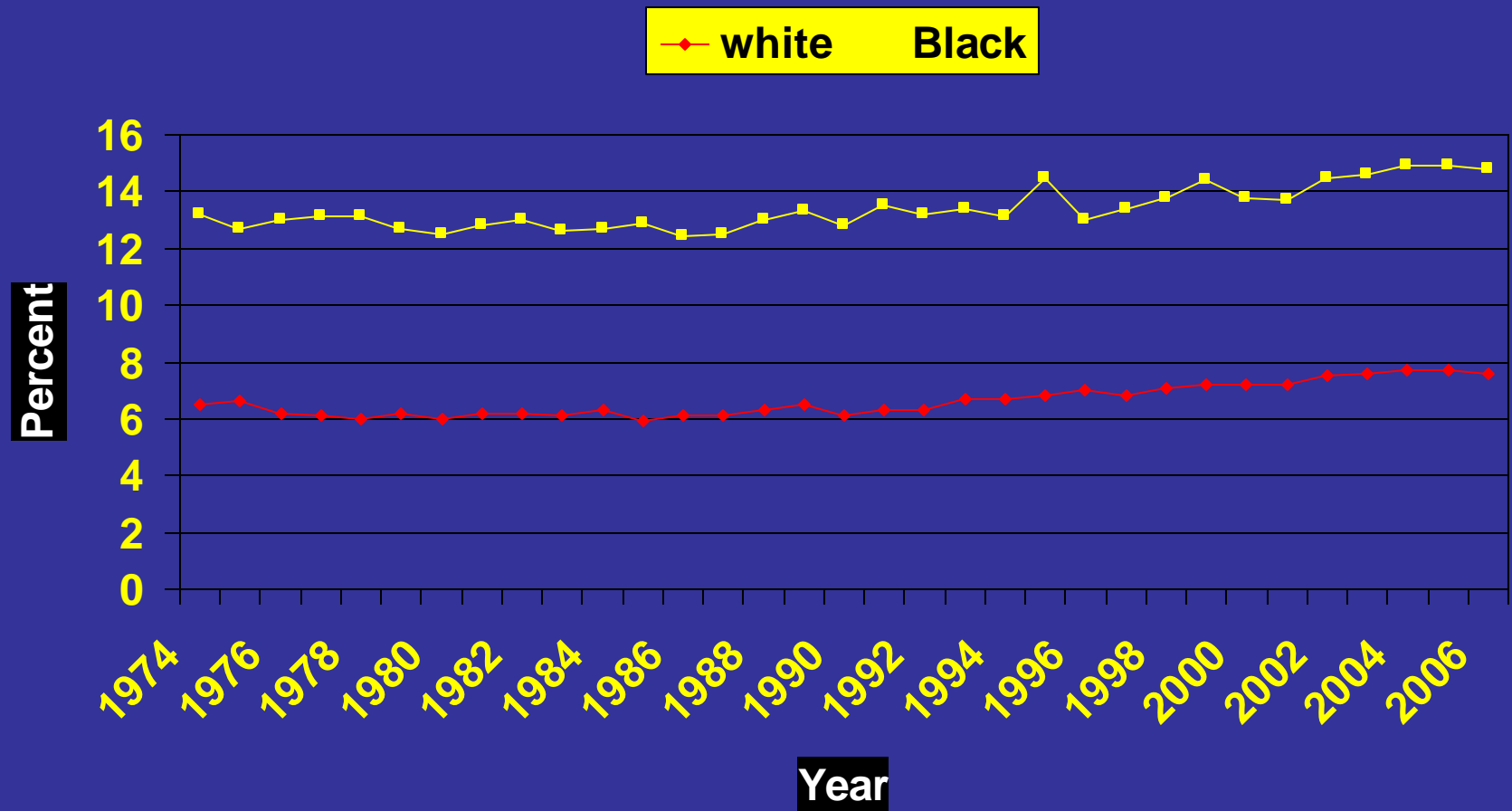
Egan BM, et. al. 2006

Lifetime Progression and Risks

Low Birth Weight Rates



Low Birth Weight (<2500g.) SC



Birth weight and hypertension

	White	Black	Total
OR – LBW (95%CI)	1.9 (1.3-2.9)	1.2 (1.0-1.9)	1.3 (1.1-1.6)
Linear trend	P<.001	P=.04	P<.01

**Trends (p-value) by birth weight categories
for hypertension prescription – ACE and
CCA (no association detected for diuretics
and beta-blockers)**

	Males White	White Females	Black Males	Black Females
ACE	0.002	0.80	0.51	0.87
CCA	0.39	0.31	0.97	0.03

Summary

- **Significant racial disparities are identified for hypertension and hypertension-related outcomes, with an earlier onset for African Americans**
- **Awareness and treatment of high blood pressure are similar**
- **Control varies by race and age**
- **Racial disparities may be affected by high blood pressure levels at younger ages and sustained for longer periods of time.**
- **Racial disparities may be affected by fetal and early life events**

